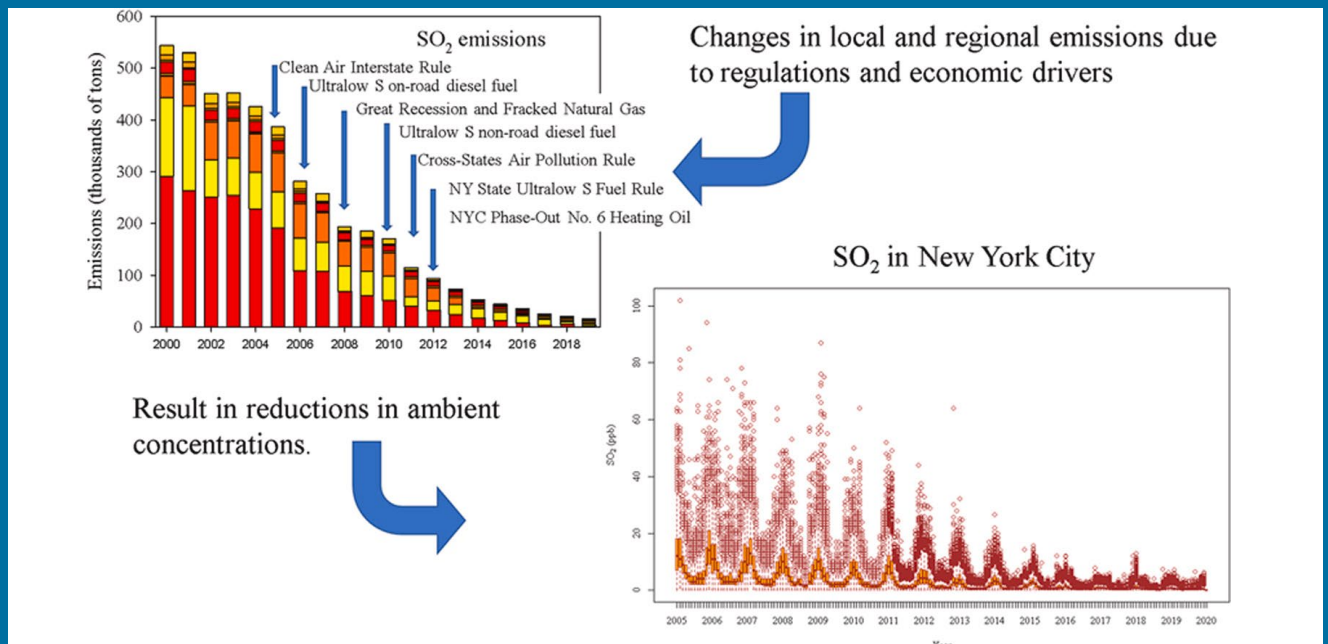


#### **Featured Research: Effects of Air Pollution Reduction Policies and Energy System Changes on New York City Air Quality from 2005-2019**

From its beginning in the late 1990s, NYSERDA’s Environmental Research Program has funded research to inform energy-related decision making and evaluate the effectiveness of state and federal policies. In the October 2023 issue of Atmospheric Environment, the NYSERDA-funded research team of Yunle Chen, David Rich, Mauro Masiol, and Phil Hopke of the University of Rochester, Universita Ca’ Foscari and Clarkson University published their findings titled “[Changes in Ambient Pollutants in New York State from 2005 to 2019: Effects of policy Implementations and economic and Technological Changes.](#)” The research team performed a trends analysis for Carbon Monoxide (CO), Nitrogen Dioxide (NO<sub>2</sub>), Sulfur Dioxide (SO<sub>2</sub>), Ozone (O<sub>3</sub>), and fine particulate matter (PM<sub>2.5</sub>) at fifty-four State DEC monitoring sites that are part of federal EPA’s Air Quality System for the period 2005-2019. During this time there were substantial reductions in source emissions and in resultant ambient concentrations of PM<sub>2.5</sub> and all ambient pollutants except O<sub>3</sub>. The figure below illustrates the policy interventions and other factors that corresponded to source emissions reductions (at left) and the resulting monitoring observations of ambient SO<sub>2</sub> concentrations in New York City (at right) during the same time period.



(Article Highlight, continued...)

Many federal, State, and local regulations led to changes in emissions during the period of study. Federal regulations included the NOx State Implementation Plan Call, NOx Budget Trading System, and Clean Air Interstate Rule which focused on reducing SO<sub>2</sub> and NOx emissions from electricity generating units. In addition, there were new regulations on vehicle emissions and fuels. At the State level, New York initiated the Renewable Portfolio Standard, the State Energy Plan, Reforming the Energy Vision, Clean Energy Fund, phased out coal-fired power production, and moved to ultra-low sulfur heating oil for #2 distillate. The New York City (NYC) Clean Heat Program phased out #6 heating oil by 2015 and will phase-out #4 by 2030.

In 2019, New York State enacted the Climate Leadership and Community Protection Act (Climate Act) and as it is implemented more dramatic changes in energy systems are anticipated to improve ambient air quality and result in lower exposures and improved public health. The team from the University of Rochester is conducting additional emissions source apportionment and epidemiology studies to further track progress and quantify benefits of the Climate Act.

The project that this work was conducted under, *Changes in PM Composition in NYS & Triggering of Acute Cardiorespiratory Events*, was selected competitively through NYSERDA Program Opportunity Notice 4230, Energy-Related Air quality and Health Effects Research in 2020.

### Citation Analysis Shows Intellectual Reach of Environmental Research Program Publications

The Environmental Research Program was recently the focus of a Citation Analysis to better characterize the performance of program-sponsored research through citation metrics. The Citation Analysis results showed that the intellectual reach of Environmental Research funded papers continues to expand. A review and analysis of 450 funded publications found those papers were cited 22,373 times. These “citing papers” were in-turn cited 819,879 times for a ratio of source papers to citations of citing papers of 1:1,822.

Intellectual Reach of ERED Funding as Matched to Web of Science in 2022

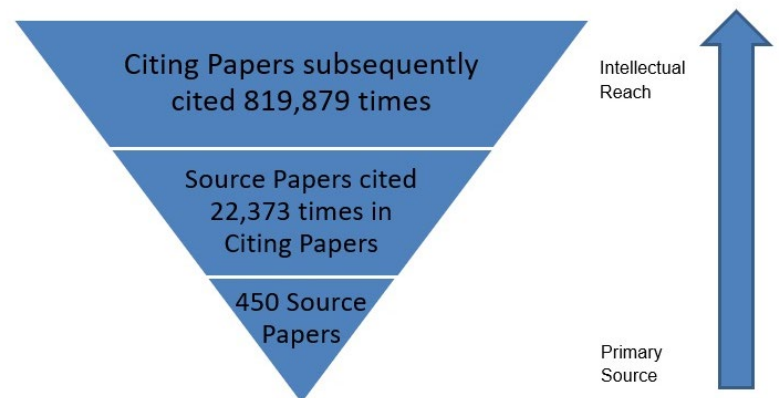


Photo Credit: NYSERDA

The evaluators found that these publications had a “C-Index” value of 1.3, indicating they were cited at a higher-rate than similarly-published papers (mean value =1.0). In addition, the number of journals publishing our research has increased from 102 journals in 2018 to 122. The journals most published in included Atmospheric Research, Environmental Science & Technology, and Ecotoxicology. The full Citation Analysis will be submitted to the NYS Department of Public Service as part of NYSERDA’s Clean Energy Fund reporting. It is also available online [here](#).



## Land Based-Renewables

- **RFI Issued for Agrivoltaics:** In September, NYSERDA released an Agrivoltaics Research and Demonstration Request for Information (RFI), which seeks to gather feedback from stakeholders to assist NYSERDA in issuing a future project solicitation for Agrivoltaic R&D projects that align with the unique needs and challenges of both the solar and agricultural industries in New York State. The RFI document is accessible on the [solicitation page](#). Responses to the RFI must be submitted on Wednesday, November 15, 2023, by 3:00 p.m. ET. If you have questions regarding the RFI, please contact [agrivoltaicdemo@nyserdera.ny.gov](mailto:agrivoltaicdemo@nyserdera.ny.gov).
- **A-TWG Update:** The Agricultural Technical Working Group ([A-TWG](#)) met twice. The [July meeting](#) featured guest speakers Jared Buono the Director of the Cornell Hudson Valley Research Lab and Chuck Schwartz of New York State Solar Farm to learn more about the agrivoltaics feasibility for specialty crops, including orchards. The [September meeting](#) featured Agrivoltaic Solutions presenting a proposed approach to establish “grazing ready” guidelines for New York State solar facilities that outline design and construction techniques meeting minimum standards for safely and securely hosting grazing animals on solar sites through the creation and dissemination of recommendations for minimum standards of site design that may be easily integrated with the engineering, planning, and construction process by solar firms and contractors.

Monarch Caterpillar on Milkweed at a Solar Site



Photo Credit: NYSERDA

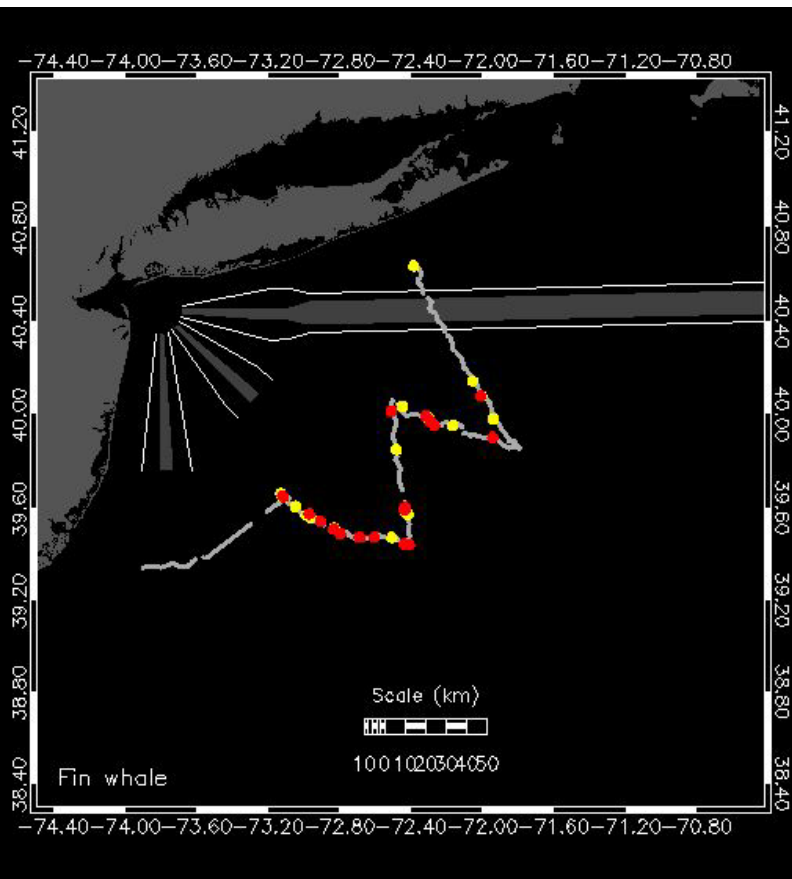
- **Solar Grazing Research:** The NYSERDA-funded American Solar Grazing Association research project wrapped up a year of field work comparing soil parameters measured underneath and between solar panels at 24 solar installations in the northeastern U.S. Initial chemical and physical testing of soil by the Dairy One Cooperative lab in New York indicated that soil respiration rates and surface hardness were both significantly higher between panels than underneath them.



### Offshore Wind

- Whale Mortality:** Since 2016, an unusual mortality event has been impacting humpback whales on the east coast of the US. The E-TWG Whale Communications Specialist Committee was formed to develop communications materials to aid in the dissemination of accurate, readily understandable information around recent whale mortality events and the level of potential risk to whales from offshore wind energy development activities. A [survey](#) is collecting input on topics of importance. More information on whales and offshore wind can be found [here](#).

Map depicting the glider route offshore between Long Island and New Jersey with fin whale detection (n=12) and possible detection points (n=4)



- Undersea Glider Deployments:** Stony Brook University, Rutgers University, and Woods Hole Oceanographic Institution completed their second deployment of a Slocum G3 glider (an autonomous underwater vehicle) off the coast of Long Island, New York to conduct surveys for baleen whales and collect oceanographic information. Thirty-day surveys will be conducted quarterly over the next two years to better characterize marine mammal presence in and around the New York Bight offshore wind areas. Whale data is being published in near-real time on [Robots4Whales](#) and oceanographic data can be found on the [SoMAS Glider](#) deployment site.
- F-TWG “Open Houses”:** The Fisheries Technical Working Group held its last of its four virtual open houses on August 15 for members of the commercial and recreational fishing industries. The purpose of these virtual open houses were to synthesize and

review previous comments the industry has provided on offshore wind and discuss with industry members how best to apply these and new comments to the Master Plan 2.0 process for the advancement of offshore wind development beyond the 60-meter contour. Further details and meeting summaries can be found at [www.nyftwg.com](http://www.nyftwg.com)

Photo Credits: Rutgers University, Stony Brook University and Woods Hole Oceanographic Institution



(Offshore Wind, continued...)

- **Offshore Wind Master Plan 2.0: Deep Water Status Update:** The Environmental and Fisheries Technical Working Groups held meetings September 11th and September 21st respectively, to discuss the draft findings of Master Plan 2.0: Deep Water Environmental and Fisheries Site Assessment Studies that will be published by the end of this year to inform New York's recommendation to BOEM for the advancement of additional wind energy development beyond the 60-meter contour. The studies include five focus areas: marine mammals and sea turtles, birds and bats, fish and fisheries, benthic habitats, and an environmental sensitivity analysis. More details from these meetings can be found on both the E-TWG website ([www.nyetwg.com](http://www.nyetwg.com)) and the F-TWG website ([www.nyftwg.com](http://www.nyftwg.com))
- **Recreational Fishing Liaison:** Captain Anthony (Tony) DiLernia, NY's recreational fisheries liaison, presented at the September 6, 2023, Suffolk Marine Anglers Fishing Club summer meeting. There were approximately 100 people in attendance. Questions about whales, lease and turbine locations, fishing access, cost of the projects by rate payers, and when will construction start for Empire Wind 1 and 2 were addressed during the meeting.

Captain Tony at the Norwalk Boat Show



Photo Credit: NYSEWDA

- Captain Tony also attended Norwalk Boat Show from September 21<sup>st</sup> through September 24<sup>th</sup>. While there, Tony manned a NYSEWDA booth focusing on issues important to the recreational community and answered general questions about offshore and the New York State offshore wind projects. Several dozen individuals and families stopped by the booth to learn about offshore wind development in the NY Bight and the work that NY is doing to develop the industry in an environmentally responsible and cost-effective manner.

(Offshore Wind, continued...)

- Morgan Brunbauer, along with other NYSERDA colleagues, attended the [American Floating Offshore Wind Technical Summit](#) in Portland, Maine from September 26 through September 27. The Technical Summit brought together leading experts to address the drivers and challenges in charting a course for floating offshore wind in the US. While there, Morgan presented on two separate panels focused on environmental and ecological permitting challenges and co-existence considerations for the fishing and offshore wind industries.
- NYSERDA continues to host a monthly offshore wind webinar series, [Learning from the Experts](#). Recent webinars have examined research and regulations for marine mammal interactions with offshore wind, transmission upgrades, and environmental data management.

Paul Smith's Adirondack Watershed Institute conducting Adirondack lake monitoring



Photo Credit: Mountain Lake Journal

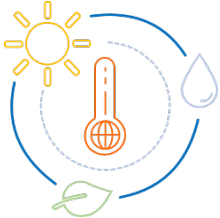


## Ecosystem Response

- **ALTM Partner Featured:** Mountain Lake Journal interviewed Paul Smith's Adirondack Watershed Institute (AWI) on Adirondack lake monitoring and the impact of climate change. Brendan Wiltse at AWI is the Project Manager of our Adirondack Long Term Monitoring lake monitoring contract and explains how AWI is utilizing water sampling opportunities to conduct additional monitoring to measure climate change impacts. The Mountain Lake Journal interview can be viewed here: <https://mountainlake.org/adirondack-watershed-institute-long-term-monitoring/>

(Ecosystems Response, continued...)

- **Loon Census:** The Adirondack Center for Loon Conservation (ACLC) concluded their annual loon census for 2023 and will be posting results including the number of loons observed on each lake. Results from previous years can be viewed on the ACLC website here: <https://www.adkloon.org/ny-annual-loon-census-results>
- **Lake “Browning” Research Update:** The Syracuse University Driscoll Lab initiated work identifying how the optical properties of dissolved organic carbon in 38 lakes participating in the Adirondack Long Term Monitoring Program relate to lake browning, acidification recovery and possible changes in the sources of organic matter to the lakes. Finalized data collected over three seasons will be made available on the Open Data NY portal.



## Climate Change

- **Climate Impact Assessment:** Peer review of the technical chapters of the Climate Impacts Assessment (CIA) is nearly complete. Final revisions and the copyedit phase has begun on the majority of chapters. Progress continues on website development and other outreach products.
- **Extreme Heat Adaptation Plan:** Program staff continue working with others at NYSERDA, NYS Department of Environmental Conservation, and other agencies on the state Extreme Heat Adaptation Plan. The targeted release is now spring 2024, which will allow for more review and public input. The final plan will include specific actions the State can take to build resilience and adapt to extreme heat, build local capacity, and support local communities.

## Air Quality and Public Health



- **Congratulations to Dr. Róisín Commame** of Columbia University who was highlighted as one of ten scientists to watch by Science News. Dr. Commame is a Principle Investigator on the NYSERDA-funded project: *Attribution of anthropogenic methane sources in downstate New York: Measuring methane, ethane, and co-pollutants from urban landfills, sewage and natural gas combustion*, which was selected competitively through NYSERDA Program Opportunity Notice 4895, Energy-related Air Quality Research. [Róisín Commame sleuths out greenhouse gas leaks to fight climate change \(sciencenews.org\)](#)



Credit: Róisín Commame

- **Congratulations to Matthew Loman** of the University of Rochester. Matthew presented the poster, “A high-resolution inventory of methane in New York State,” at the 2023 International Emissions Inventory Conference sponsored by the US EPA in Seattle, WA Sept. 26-29, 2023, for which he won the Best Young Science Poster award.

# Program Reports and Papers

Program Reports & Papers posted recently include:

***Air Quality and Related Health Research: Particulate Matter (PM), Ozone and Co-Pollutants***

Chen, Y.; Rich D.Q.; Masiol, M; Hopke. P.K. (2023) Changes in ambient air pollutants in New York State from 2005 to 2019: Effects of policy implementations and economic and technological changes. Atmospheric Environment 311, <https://doi.org/10.1016/j.atmosenv.2023.119996>

Hassan, Hesham, Jie Zhang, and James Schwab, “Harmonization of the Long-term PM 2.5 Carbon Data from the CSN Sites in New York State” Aerosol and Air Quality Research (2023), 23, 9. 230077, <https://doi.org/10.4209/aaqr.230077>

Luo, G., & Yu, F. (2023). Impact of air refreshing and cloud ice uptake limitations on vertical profiles and wet depositions of nitrate, ammonium, and sulfate. Geophysical Research Letters, 50, e2023GL104258. <https://doi.org/10.1029/2023GL104258>