Office of Atmospheric Protection Update

National Ambient Air Monitoring Conference – August 2024
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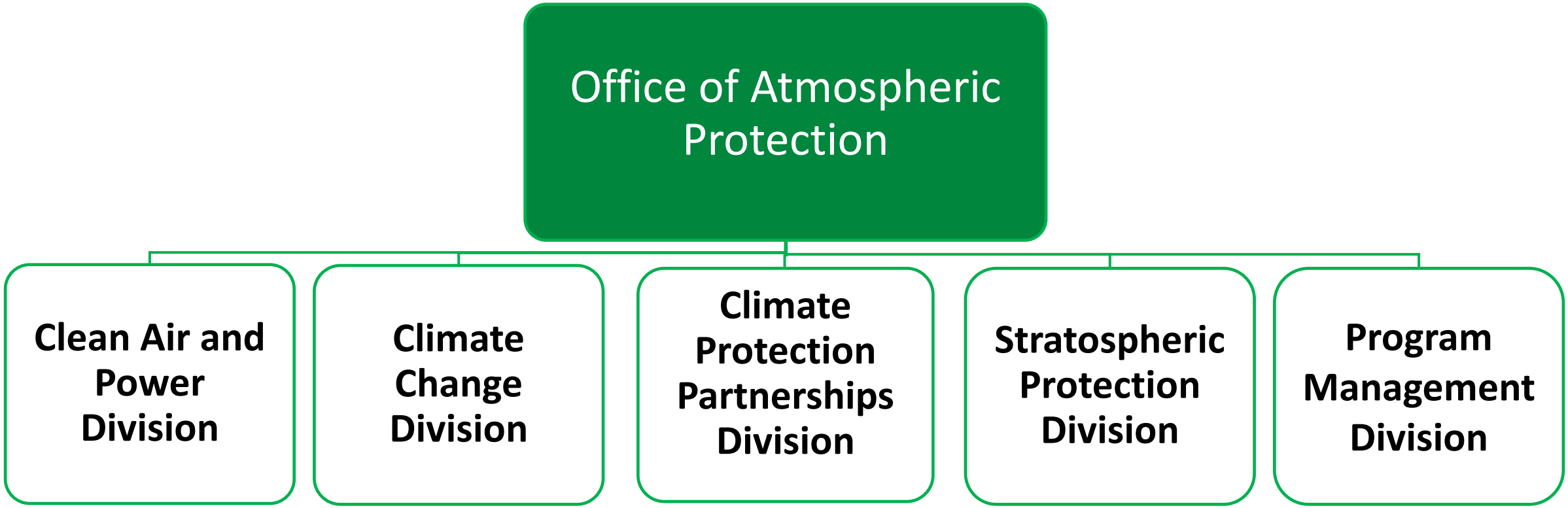
US Environmental Protection Agency

Outline

- OAP organization
- Clean Air and Power Division
  - Programs and progress
- OAP monitoring programs
- Power sector data and tools

EPA/NPS co-located CASTNET sites at Rocky Mountain National Park, CO


Office of Atmospheric Protection
Clean Air and Power Division
Climate Change Division
Climate Protection Partnerships Division
Stratospheric Protection Division
Program Management Division

Clean Air and Power Division's Power Sector Programs

Regulatory Programs

- **Acid Rain Program (1995)**
- **Cross-State Air Pollution Rule (CSAPR, 2015)**
- **CSAPR Update (2017)**
- **Revised CSAPR Update (2021)**
- **Good Neighbor Plan (2023)***

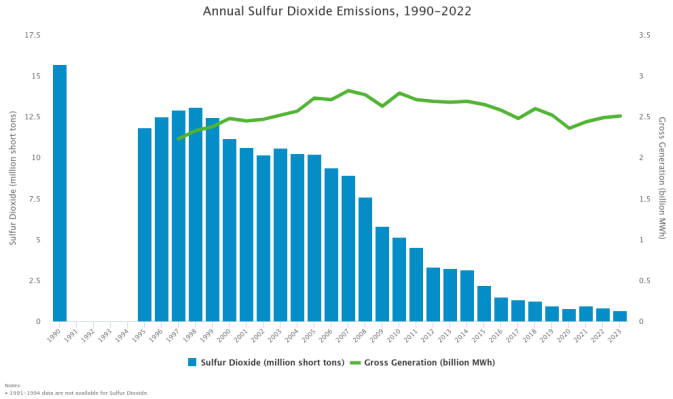
*Currently subject to SCOTUS stay order

Partnership Programs

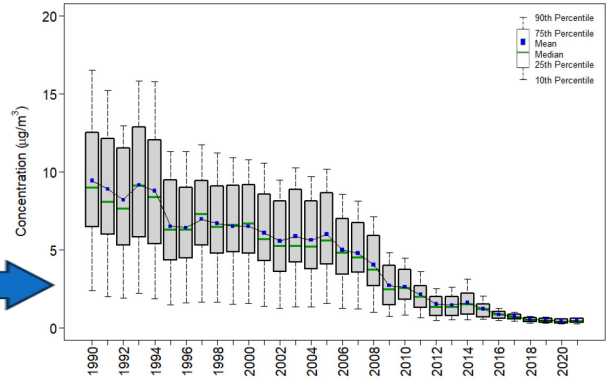
- **Green Power Partnership (GPP, 2001)**
  - Encourages organizations to voluntarily use renewable electricity
- **SF_6 Emission Reduction Partnership for Electric Power Systems (1999)**
  - Collaborative effort between EPA and the electric power industry to reduce SF_6 emissions (a highly potent GHG used in electric transmission and distribution equipment)

Comprehensive Information About the Evolving Power Sector

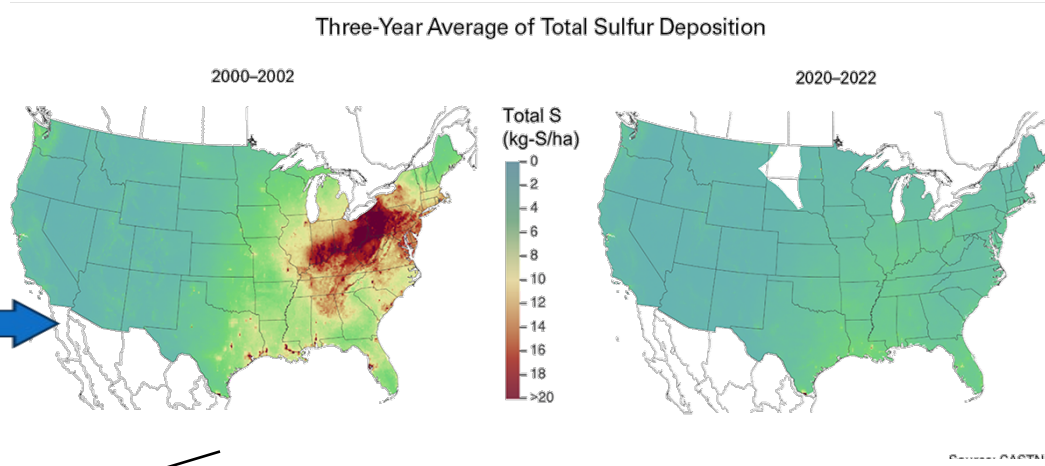
Emissions from Electric Generating Units



Air Quality



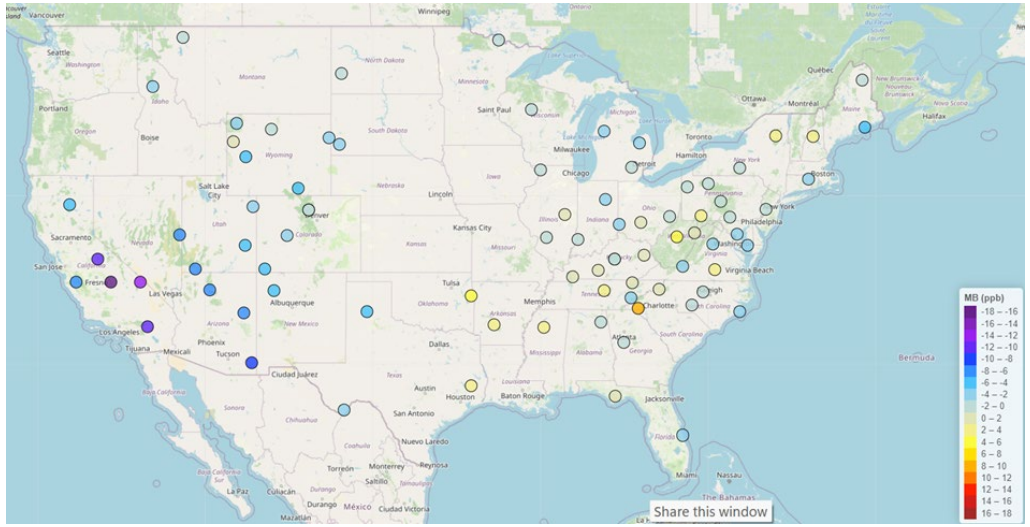
Atmospheric Deposition



https://www.epa.gov/power-sector/progress-report

Air Quality Data that Informs Multiple Policy and Scientific Goals

- Provide data in rural areas/communities, on tribal lands, and within National Parks and other Class I areas to improve understanding of:
  - atmospheric pollutant transport (e.g., local versus regional),
  - secondary aerosol formation, and
  - evolving environmental issues (e.g., climate impacts on air quality).
- Provide data to validate model results used to evaluate results under future NAAQS and emissions control scenarios
- Evaluate human and environmental health impacts under current and future emission reduction programs
- Assess program effectiveness using high-quality, consistent data to track trends and changes in the chemical makeup of the atmosphere

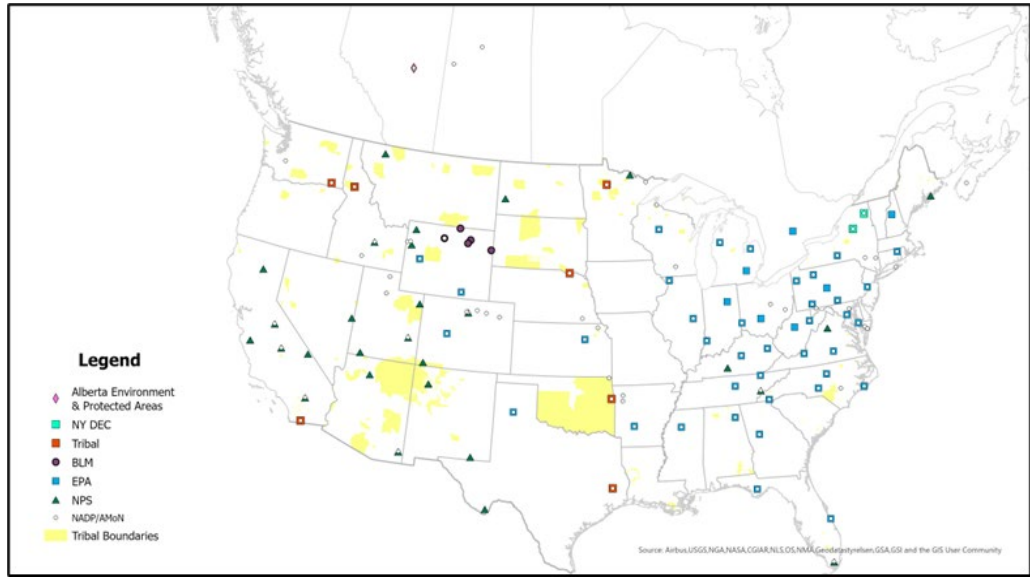


Modeled bias in 8-hour daily maximum ozone (CMAQ-CASTNET) from May – September 2019.

CAPD Air Quality Monitoring

Over the last three decades CASTNET has adapted to changing scientific, Agency and S/L/T data needs:

- CASTNET launch coincided with the 1990 Clean Air Act Amendments, driven primarily by tracking the key constituents of acid deposition
- Upgraded to regulatory ozone monitoring to support NAAQS decisions
- Designed lower-cost multipollutant monitoring sites to forge and support new partners to address emerging Agency priorities (e.g., fill in key data gaps)
- In partnership with NADP, CAPD established the Ammonia Monitoring Network (AMoN) in 2007.
    - Data can be used to support PM2.5 precursor demonstrations as permitted by the PM2.5 State Implementation Plan Requirements Rule
- CASTNET + NADP sites important for understanding air quality impacts from energy transition, NAAQS attainment, especially in rural America, and contribute to understanding of climate change impacts on air quality



CASTNET and NADP Ammonia Monitoring Network (AMoN) site locations. CASTNET sites are funded by OAP, ORD, other federal and state agencies.

CASTNET: Scientific Review

- After 35 years, it was time to take a fresh look at the Network to modernize and ensure continued viability as a multipollutant monitoring network
  - Temporarily suspended a number of monitoring sites to address budget constraints
- In Spring 2022, EPA's Science Advisory Board (SAB) accepted OAP's request to conduct a scientific review and advise on potential network configurations to prioritize data and modernization needs and achieve cost-savings
  - SAB assembled a panel made up of experts from Federal, Tribal, State Agencies, universities, NGOs, and industry (thank you!)
  - Submitted their final report and recommendations to the Agency in April 2024.
  - Applauded the quality of the network and made recommendations to assist EPA in optimizing the network's scientific value while also meeting new priorities
  - Included recommendations on critical investments to the program (e.g., repair infrastructure, replace aging ozone analyzers, add PM2.5).
  - Provided a framework to use to optimize the network by prioritizing specific air quality monitoring sites and measurements
- Plan to modernize the CASTNET program will be rolled out 2024-2028 starting with engaging partners.

Adapting to Evolving Data Needs

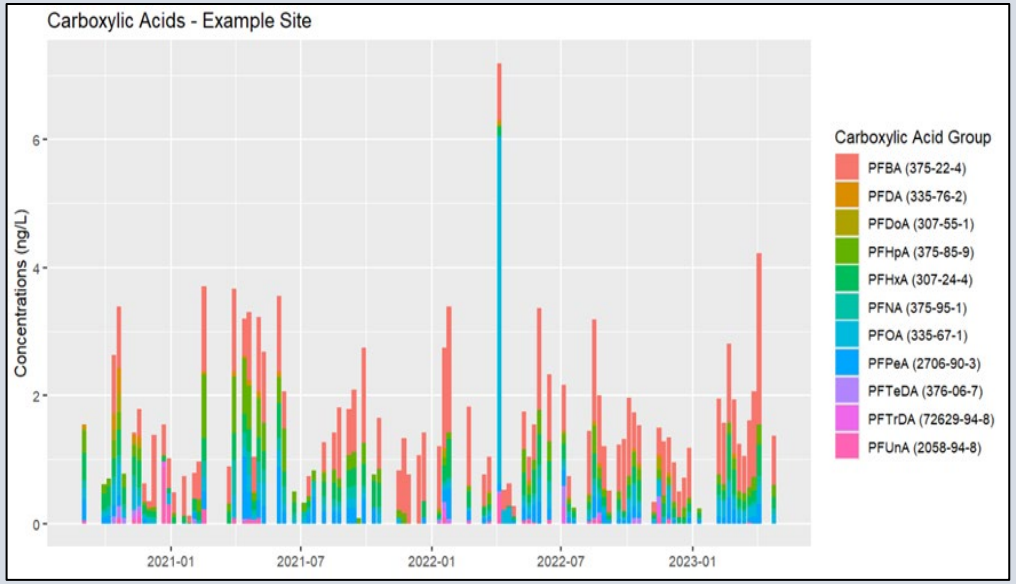
CASTNET data and infrastructure can be used to evaluate how long-term shifts and resulting climate-driven events impact policy and programs

- The length and consistency of the CASTNET data record and the rural sites make the network a unique resource for assessing air quality-climate change interactions (e.g., wildfire smoke)
- What are the air quality and regulatory impacts associated with increasing frequency and intensity of wildfires?
  - Evaluating long-term relationships between pollutants during smoke and non-smoke impacted periods to characterize current and future impacts from increases in biomass burning in Western US
  - Pilot study to evaluate contribution of organic nitrogen using CASTNET filter packs. Preliminary results have shown organic nitrogen contributes ~15% to total N, much higher when samples are impacted by wildfire smoke
- Pursuing these projects through partnerships with ORD, Regions, Tribes, State Agencies and Universities

Utilizing Existing Monitoring Infrastructure

- CASTNET has a long history of partnerships across the Agency, and with Tribes, states, and other organizations to address data gaps
- Provide expertise in atmospheric monitoring and use of CASTNET's long-term infrastructure to advance important new collaborative monitoring and research (e.g., reduced nitrogen, PFAS).
- Strongly encourage and expect this cooperation to continue.

CASTNET provided site infrastructure and coordination to assist ORD research project: ***Understanding the sources, fate, transformation and transport of PFAS compounds.*** *Leveraging this research, the CASTNET team has helped NADP establish a PFAS pilot network that has grown to more than 30 sites with support from tribal, federal, and state agencies.*



Mass concentrations from an example site for the PFAS Carboxylic Acids from September 2020 - March 2023.

CAPD Data Products and Resources

Power Sector Data and Tools

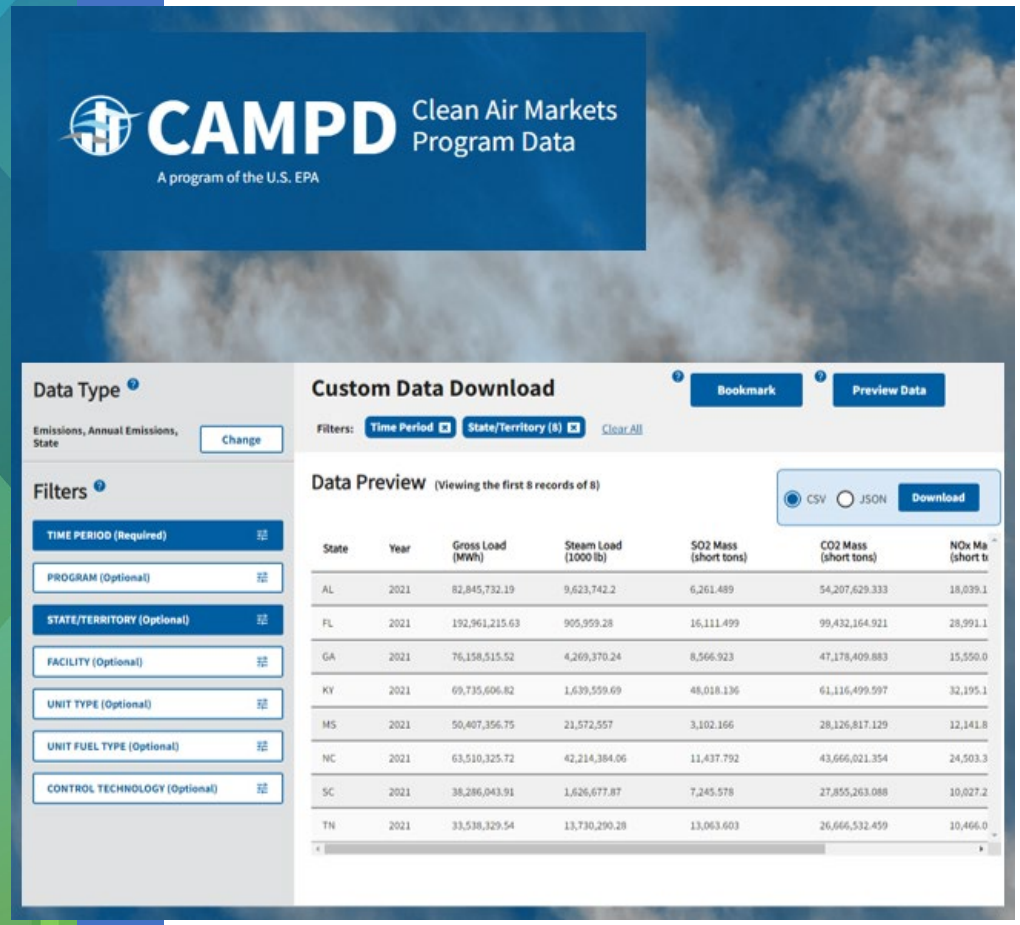
Interactive tools to understand and access the data:

- **Clean Air Markets Program Data** (CAMPD): a web-based application that allows you to create custom queries, view reports, and download data
  - continuously monitored SO_2, NO_X, CO_2, and mercury emissions data from power plants nationwide
  - operations data, facility information, monitoring plans, and quality assurance test information

- **Emissions & Generation Resource Integrated Database** (eGRID): database combining CAPD data and Energy Information Administration data to determine annual emissions and emission rates (lbs/MWh) at various aggregated levels in the U.S.

- **Power Plants and Neighboring Communities**: Interactive map showing demographics, plant characteristics such as size and fuel type, and quantity of annual plant-level emissions of SO_2, NO_X, CO_2, and $PM_{2.5}$

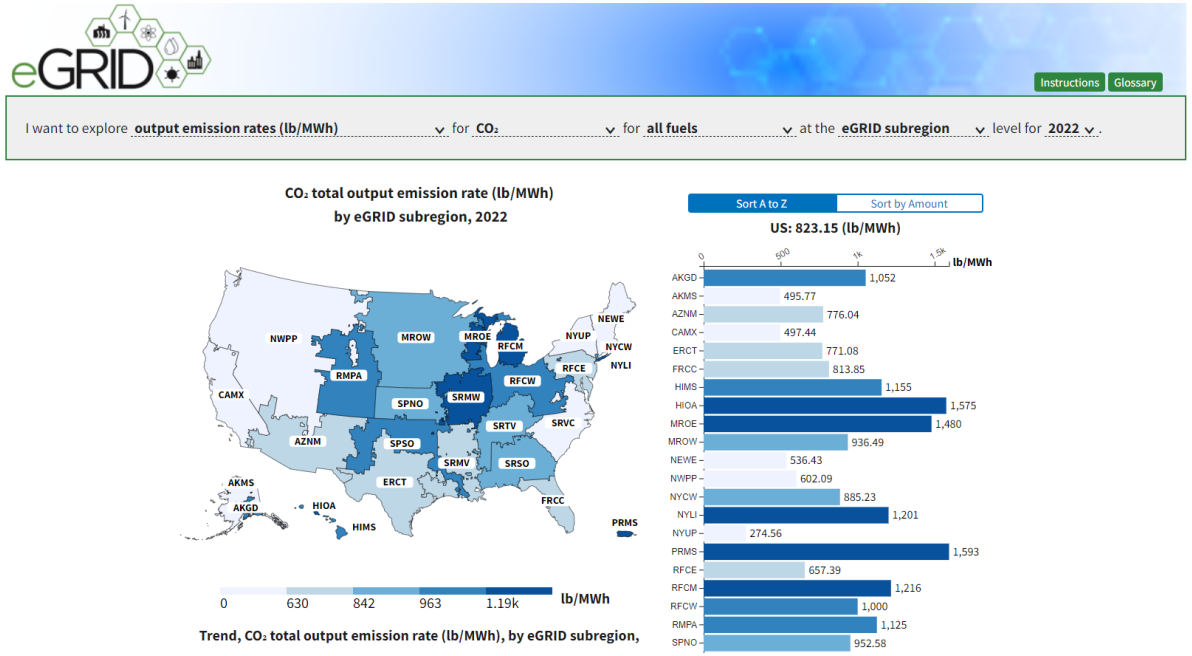
Accessing the Data: CAMPD



https://campd.epa.gov

- Comprehensive source of power plant data for public consumption
  - Allowances, compliance, emissions, facility attributes
  - Users: industry, academics, NGOs, states, and general public
  - 4,500 + daily downloads
- Recently re-engineered with new technology and essential functionalities for data access
  - Custom query building
  - Allows scripts/programs to access data
  - Large bulk datasets

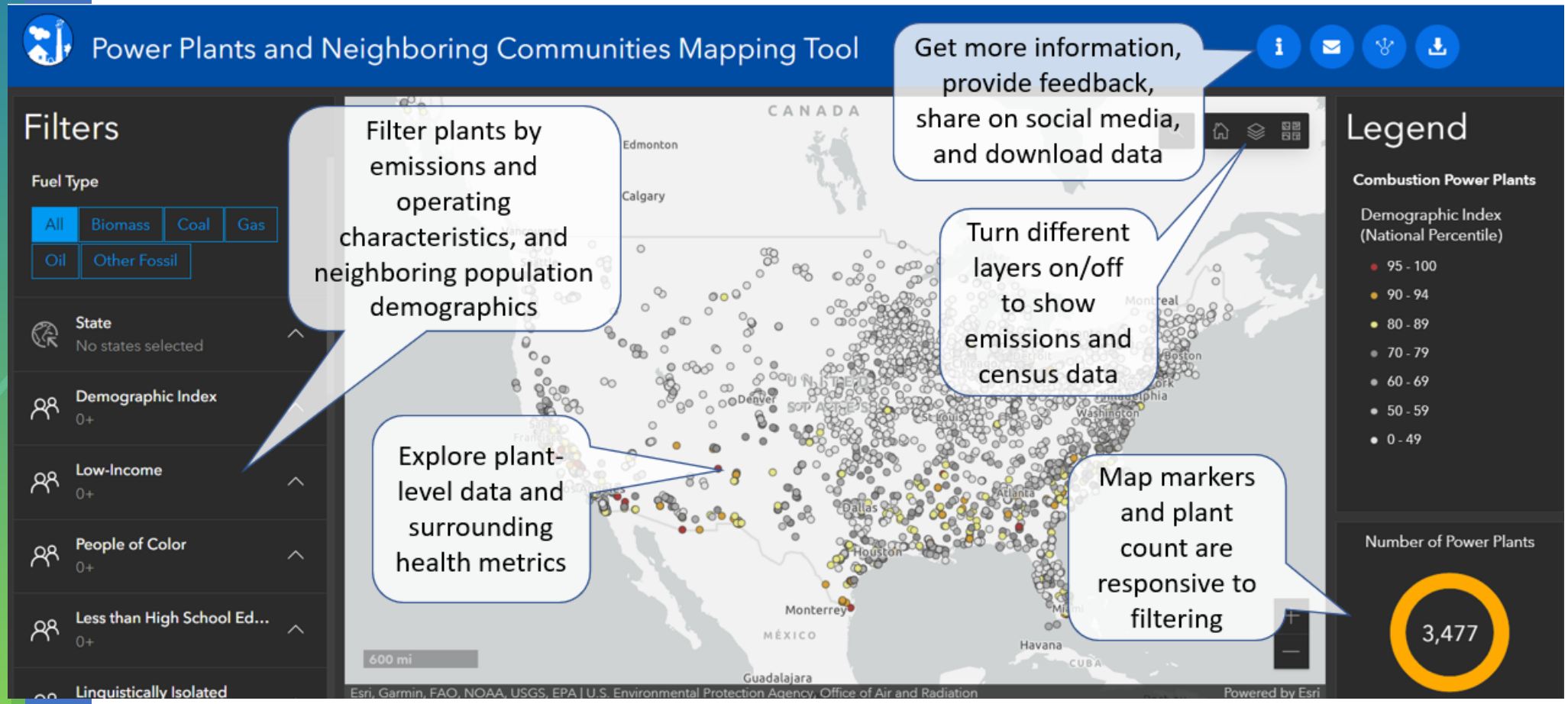
Accessing the Data: eGRID



https://www.epa.gov/egrid

- Emissions & Resource Integrated Database
  - Information includes emissions and emissions rates, net generation, and resource mix.
  - Calculates air emissions associated with electricity use in a credible, consistent, and regionally-relevant way
  - Used by NGOs; federal and state agencies, corporations, academia and researchers; and the general public.

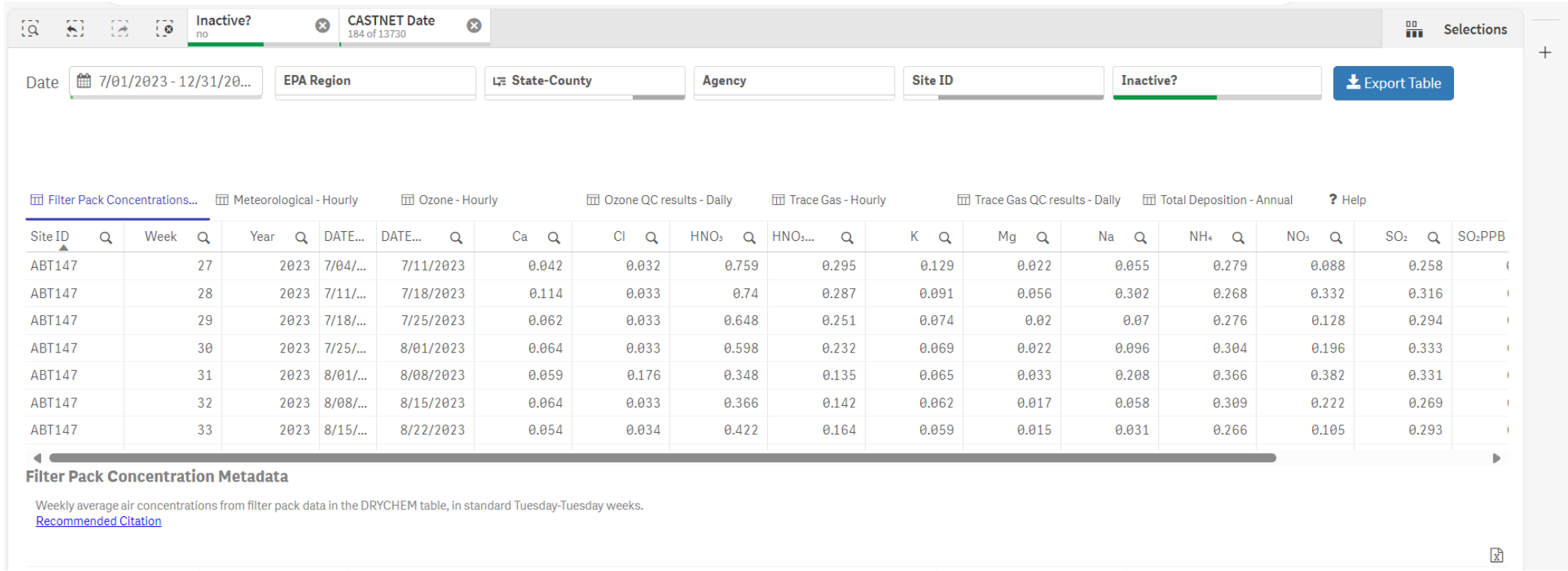
Accessing the Data: Power Plants and Neighboring Communities



https://www.epa.gov/power-sector/power-plants-and-neighboring-communities

Accessing the Data: CASTNET

In addition to reporting data to AirNow and AQS, the hourly data (ozone, gases, and QC data) are available on the CASTNET website within 24-48 hours and filter pack data and total deposition data are updated as it becomes available.



https://www.epa.gov/castnet/download-data

Thank you!

CASTNET Air Quality Program:
https://wwww.epa.gov/castnet

Clean Air and Power Sector Programs**:**
https://www.epa.gov/power-sector