

Recommendation 1: The federal government should facilitate and support the development and adoption of low cost AQ monitoring sensing systems..

Description:

IoT sensing allows for the effortless collection of data from multiple devices and technical innovation in IoT has emerged in research communities worldwide, which together provide new opportunities for low-cost, high resolution, environmental monitoring. However, wider implementation of such devices in the United States will require the approval and encouragement of the federal government.

Justification:

- Regulatory grade sensors are expensive (250K +) and only a few can be deployed (e.g. 1 in SF, 1 covering 455 sq miles of San Mateo County, etc.). Their purpose is specific to looking at broad air quality of an area and compare against EPA levels to protect health and welfare (epidemiological reasons). This limits the scaling of AQ monitors
- Gap in local (community) scalable air quality monitoring to support a variety of use cases, including
 - Increasing public awareness of AQ
 - Informing environment and public policy; real time testing of policy impacts
 - Environmental justice work
 - Supplementing regulatory grade sensing with com sensors
 - Public health research
 - Construction site emissions monitoring
 - Rapid or emergency AQ monitoring

Implementation Considerations:

- Facilitate research in low-cost sensing technologies for criterial pollutants, such optical particle scanning for particulate matter and M0x elements for gases, as well as detection of emerging pollutants of concern.
- Facilitate and support research and a program in correlating regulatory grade data with low cost AQ data
- Facilitate the expansion of wireless connectivity to support remote monitoring and sensing in areas not serviced by traditional connectivity (TV white space, satellite, etc.)

Potential implementation barriers:

- Different federal agencies (e.g., EPA, BLM, US Forestry Service) have adopted IoT monitors and different ways and can have different protocols for interpreting the same raw data. Consistent standards for interpreting IoT monitoring data will be needed
- Federal policies take time to be implemented at a state and local level. Funding must accompany IT device related policy statements.

Possible participating agencies:

- The EPA; DoC, FCC, NIST.

Recommendation 2: The federal government should consider establishing data repositories for privately collected data

Description:

The growth in IoT devices portends a rapid deployment of devices. These devices have the potential to provide a strong public good, however without transparency privacy and data ownership issues may arise. Additionally, the use of different technologies and methodologies across different platforms may result in conflicting measurements, fostering misinterpretation and reducing public confidence in the monitoring process.

Justification:

- Federal data repositories provide transparency and the opportunity to community research to conduct analysis on the data far beyond the capabilities of a single federal agency

Implementation Considerations:

- Consider DOE EIA sharing of power plant data as a possible implementation template

Potential implementation barriers:

- Data should be directly from devices to minimize any differences in post processing

Possible participating agencies:

- The EPA, DOE, DoC, NIST