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Using Artificial Intelligence to Improve Data Accuracy of Air Pollutants under the Clean Air Act

*Lauren Palley**

Over the last century, industrialization and the air pollution that has come with it have put the planet and its future stability at risk.[1] Artificial intelligence technology (AI), part of a larger "Fourth Industrial Revolution," has the potential to mitigate these effects through widespread implementation by the Environmental Protection Agency (EPA).[2] The EPA is the governmental agency responsible for regulating air pollutants pursuant to the Clean Air Act (CAA).[3] Congress delegated the authority to the EPA to regulate greenhouse gases (GHGs), such as carbon dioxide, that trap solar energy in the atmosphere.[4] Under the CAA and the Supreme Court's decision in *Massachusetts v. U.S. Environmental Protection Agency*,[5] the EPA has both the authority and the duty to regulate GHGs using AI since it is the best available technology.

The CAA requires the EPA to set health-based standards for ambient air quality, set deadlines as to when the achievement of those standards must be met, and set national emission standards for large sources of air pollution, including motor vehicles, power plants, and other industrial sources.[6] Section 109 of the CAA requires the EPA to establish National Ambient Air Quality Standards (NAAQS) for pollutants that endanger the public health or welfare, in the EPA Administrator's judgment, and whose presence in ambient air results from numerous or diverse sources.[7] The NAAQS for "certain common and widespread pollutants" must be based on the "latest science."[8] The latest science is AI, and therefore, the EPA has the authority under the CAA to use AI in relation to the NAAQS.

AI describes computer systems that simulate human intelligence through their ability to think, learn, and sense their environment.[9] AI is the most advanced technology for analyzing large amounts of data, reaching conclusions about that data, finding patterns, and predicting future behavior.[10] It has the potential to be at the forefront of solving climate change issues and creating a more sustainable future if it is implemented in various key areas, especially in data collection and processing of air pollutants pursuant to the EPA's duty. AI can assist with measuring harmful GHGs that have previously been invisible to the naked eye, particularly methane, more effectively and thus creating a larger, more accurate dataset to analyze.[11] Acting under its authority and duty to regulate GHGs, the EPA's implementation of AI would allow pollution that was previously difficult to observe, measure, and report to be visible by all parties involved in real time.

Additionally, case law over the last decade has further defined the EPA's authority and duty to regulate GHGs using the newest technologies. In *Massachusetts v. U.S. Environmental Protection Agency*, the Supreme Court relied heavily on scientific data regarding global warming when it established that the EPA not only has the ability, but also has a duty to regulate GHGs as they fall under the CAA's definition of "air pollutant."[12] The Court also emphasized in a later case, *American Electric Power Co. v. Connecticut*,[13] that due to Congress's delegation of authority to the EPA, it is the most equipped body to deal with GHGs because agencies can utilize "scientific, economic, and technological resources."[14] Additionally, the Court ruled in *Utility Air Regulatory Group v. U.S. Environmental Protection Agency*[15] that the Agency has the authority to require the best available control technology (BACT) from certain previously regulated sources.[16] Therefore, the EPA's authority to regulate GHGs using the best technology available, such as AI, is consistent with relevant case law.[17]

The Office of Inspector General (OIG) of the EPA authored a report and key example where AI could be beneficial and should be implemented. The report showed that of all major CAA facilities that have had an evaluation in the last five years, data uploaded into the EPA's Enforcement and Compliance History Online (ECHO) system was inaccurate.[18] Data was either not reported or was inaccurately entered into the database.[19] These errors went undetected "because of a lack of data quality oversight that would identify facilities overdue for [Full Compliance Evaluation]."[20] This inaccurate data hindered the EPA's oversight of compliance programs and allowed for numerous major CAA facilities to potentially emit large amounts of undetected or unreported air pollutants.

Taking new technologies into consideration under its authority and duty to regulate GHGs using the most advanced technology, the EPA finalized a rule in 2016 establishing new source performance standards for the oil and natural gas sector.[21] In part, it mandates that "monitoring of the components must be conducted using optical gas imaging,"[22] in addition to adding a provision for emerging technology such as continuous emissions monitoring technologies.[23] Optical gas imaging (OGI) is the use of infrared cameras to detect invisible pollution such as methane leaks and provides images of a leak depicted as black clouds.[24] However, while these images are helpful, they cannot provide quantitative information about the fugitive emissions they photograph.[25] Quantitative data is crucial for GHG management because "you can't improve what you can't measure."[26] The

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EPA's implementation of AI is necessary, in addition to OGI, to measure several key GHG emissions. Without the use of AI, the EPA is failing to meet its duty to regulate GHGs using the newest available technology.

Because the EPA has the authority to regulate significant air pollutants that are emitted from facilities, accurate data collection is crucial for effective reporting. Once the data is gathered, the EPA must efficiently analyze it to achieve accurate results to view past, current, and future emissions. Gathering accurate emissions data is only one step of the process, but it is essential for determining NAAQS. As part of EPA's Next Generation Compliance Program, the EPA is "commit[ed]" to start using outside sources for data to improve data accuracy.[27] Once EPA integrates AI within the Agency and employs outside sources, the technology would benefit the entities it regulates, decisionmakers, and all communities impacted by air pollution.[28] Pursuant to the CAA and relevant case law, the EPA is required to use the latest available technology and must strive to incorporate artificial intelligence more widely and with more urgency.

ENDNOTES

[1] Celine Herweijer, Dominic Waughray, *Fourth Industrial Revolution for the Earth: Harnessing Artificial Intelligence for the Earth*, PRICEWATERHOUSECOOPERS (JAN. 2018), https://www.pwc.com/gx/en/sustainability/assets/ai-for-the-earth-jan-2018.pdf (referring to a "Fourth Industrial Revolution" characterized by AI, an "established digital economy . . . the Internet of Things, robots, autonomous vehicles, biotechnology, nanotechnology and quantum computing" that will transform current industries).

[2] *Id.* (discussing how AI is only one characteristic of the "Fourth Industrial Revolution").

[3] 42 U.S.C. § 7401 (2012).

[4] Massachusetts v. U.S. Envtl. Prot. Agency, 549 U.S. 497, 497 (2007) (holding that the EPA has the authority to regulate GHGs and explaining the danger of GHG as "when carbon dioxide is released into the atmosphere, it acts like the ceiling of a greenhouse, trapping solar energy and retarding the escape of reflected heat").

[5] *Id.*

[6] CONG. RESEARCH SERV., RL 30853, CLEAN AIR ACT: A SUMMARY OF THE ACT AND ITS MAJOR REQUIREMENTS (NOV. 7, 2018) [hereinafter Clean Air Act: A Summary].

[7] *Id.* at 3 (referring to the Administrator of the EPA, the head of the agency).

[8] *Clean Air Act Requirements and History*, U.S. ENVTL. PROT. AGENCY (JAN. 10, 2017), https://www.epa.gov/clean-air-act-overview/clean-air-act-requirements-and-history; *see also* Clean Air Act: A Summary, *supra* note 6, at 3 (discussing that the CAA requires the EPA to review the scientific data which the standards are based every five years).

[9] *Using Artificial Intelligence in Law Departments*, THOMSON REUTERS, 2018 https://1.next.westlaw.com/Document/Iddbbd1a8003511e89bf099c0ee06c731/View/FullText.html?contextData=(sc.Default)&transitionType=Default (last visited Dec. 20, 2018) (noting how AI improves tasks over time, but this is not an official legal definition).

[10] *Id.*

[11] *See* Cynthia Giles, *Next Generation Compliance*, 30 ENVTL. FORUM 22, 22 (SEPT./OCT. 2013).

[12] *Massachusetts*, 549 U.S. at 506 (citing to the CAA's definition of "air pollutant" to include "any air pollution agent or combination of such agents, including any physical, chemical, biological, radioactive . . . substance or matter which is emitted into or otherwise enters the ambient air").

[13] 564 U.S. 410 (2011).

[14] *Id.* at 428 (reinforcing that the EPA, as the expert agency on the matter, is best suited "to serve as primary regulator of greenhouse gases").

[15] 573 U.S. 302 (2014).

[16] *Id.* at 331 (holding the EPA's decision to require best available control technology for greenhouse gases emitted by certain sources is permissible under the Clean Air Act).

[17] *E.g.*, *id.* at 329; *Am. Elec. Power Co.*, 564 U.S. at 410; *Massachusetts*, 549 U.S. at 497.

[18] U.S. ENVTL. PROT. AGENCY, ENFORCEMENT AND COMPLIANCE: CLEAN AIR ACT FACILITY EVALUATIONS ARE CONDUCTED, BUT INACCURATE DATA HINDER EPA OVERSIGHT AND PUBLIC AWARENESS 9 (2016) (explaining how the EPA conducts facility evaluations for all major CAA facilities in accordance with the Compliance Monitoring Strategy (CMS) to ensure companies' compliance with EPA laws and regulations).

[19] *Id.* (clarifying that ECHO integrates data from other EPA databases to provide the public with facility-specific compliance information data from other EPA databases to provide the public with facility-specific compliance information).

[20] *Id.*

[21] Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources, Final Rule, 81 Fed. Reg. 107, 35824 (Jun. 3, 2016).

[22] *Id.* at 35846 (asserting its authority to regulate monitoring and repair of fugitive emission components at well sites and compressor stations).

[23] *Id.* at 35861 (allowing for the use of emerging technology, like continuous emissions monitoring technologies, and agreeing that the continued development of these cost- effective technologies should be encouraged); *see also* David A. Hindin & Jon D. Silberman, *Designing More Effective Rules and Permits*, 7 GEO. WASH. J. ENERGY & ENVTL. L. 103, 123 (2016) ("[P]roviding regulated entities with accurate measures, in a standardized format, of deviations indication that regulatory requirements are being, or may soon be, violated.").

[24] Laith Amin, *Disruptive Technology Meets the Intractable Challenge of Fugitive Gas Emissions*, ADVISIAN, https://www.worleyparsons.com/~/media/Files/W/WorleyParsons/documents/markets/fugitivegasemissions.pdf (last visited Nov. 12, 2018). (explaining how OGI utilizes infrared technology to capture emissions otherwise invisible to the human eye); *see also* Robert L. Glicksman, David L. Markell & Claire Monteleoni, *Technological Innovation, Data Analytics, and Environmental Enforcement*, 44 ECOLOGY L. Q. 41, 67 (2017) (discussing how agencies, including the EPA, are starting to utilize infrared camera technology).

[25] Amin, *supra* note 24.

[26] *Id.*

[27] Glicksman, Markell & Monteleoni, *supra* note 24, at 69; *see also* Giles, *supra* note 11 (describing the EPA's Next Generation Compliance initiative and its five key components: design regulations and permits, advances emissions and pollutant detection technology, electronic reporting, expanded transparency, and innovative enforcement).

[28] Glicksman, Markell & Monteleoni, *supra* note 24, at 65.