

From Risk to Resilience: AI-Driven Policies for Environmental Health Equity

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Developing effective environmental health policy is time intensive, resource heavy, and requires specialized expertise. These challenges have been worsened by long-term funding reductions and staffing cuts. EPA staffing fell by 3,197 positions from January to September 2025, and states have reduced environmental staff by approximately 5,700 positions over the last decade, while relying on EPA for more than 25% of their environmental operating budgets. Federal programs such as Superfund (CERCLA) face drastic cuts, with a proposed 47 percent decrease in 2026 to \$282.7 million. Longstanding Environmental Justice programs have also been eliminated, including the federal EJ Screen tool, leaving a critical gap in national environmental justice data.

To address these challenges, we designed a two stage modeling and policy generation pipeline. Our team first developed a model to identify the two most significant risk factors contributing to respiratory and cancer outcomes within a given census tract. The outputs of this model are then fed into a policy-generation pipeline, along with the tract's demographic data. The pipeline produces an AI-generated policy recommendation tailored to mitigate the identified risk factors. To ensure the recommendations are feasible and to reduce the risk of LLM hallucinations, the system constrains its search space to the NCSL Environment & Natural Resources Legislation Database. All of this functionality is integrated into a web application, where users can select any census tract and receive data driven, context-specific policy recommendations.

By converting complex environmental health data into actionable, evidence-based policy recommendations, our platform empowers local governments, public health officials, and community advocates to make informed decisions quickly and affordably. The system is scalable across regions, adaptable to additional health outcomes, and designed to evolve as new data and policies emerge. Beyond scalability and adaptability, our platform enhances the oversight and allocation of limited resources.

Computing a healthier future means making high quality environmental policy development accessible to every community, not just those with extensive funding or technical capacity. In an era of constrained resources and reduced federal state staffing, our tool supports federal and state oversight by increasing efficiency and guiding the allocation of limited funds. By streamlining data driven decision making, this system ensures environmental health benefits reach the communities that need them most while helping agencies optimize their weakened workforce.