

How Algorithm Assisted Decision Making Is Influencing Environmental Law and Climate Adaptation

Sonya Ziaja¹

ABSTRACT

Algorithm-based decision tools in environmental law appear policy neutral but embody bias and hidden values that affect equity and democracy. In effect, algorithm-based tools are new actors in law. In turn, they influence the development and implementation of environmental law and regulation. As the Biden Administration returns the United States to climate change policymaking, there is a pressing need to understand how these automated decision-making tools interact with and influence law and policy. This paper begins this timely and critical discussion.

Though algorithmic decision-making has been critiqued in other domains, like policing and housing policy, environmental and energy policy may be more dependent on algorithmic tools because of climate change. What used to be background expectations of climatic stationarity—for example how frequently or severely a coastal area floods or how many days of extreme heat an energy system needs to anticipate—are no longer valid. Dependence on these tools brings with it a conflict between technocracy (and the need to rapidly adapt and respond to climate change) and democratic participation. This paper discusses sources of that tension within environmental algorithm-based tools and offers a pathway forward to integrate values of equity and democratic participation into the tools.

After introducing the problem of water and energy adaptation to climate change, the paper synthesizes prior multidisciplinary work on algorithmic decision making and modeling informed governance—bringing together the works of early climate scientists and contemporary leaders in algorithmic decision-making. From this synthesis, this paper presents a framework for analyzing how well these tools integrate principles of equity, including procedural and substantive fairness—both of which are essential to democracy. The framework evaluates how the tools handle uncertainty, transparency, and stakeholder collaboration across two attributes. The first attribute has to do with the model itself—specifically, how, and whether, existing law and policy is incorporated into these tools. These social parameters can be incorporated as inputs to the model, or in the structure of the model, which determines its logic. The second attribute has to do with the modeling process—e.g., how, and whether, stakeholders and end-users collaborated in the model's development.

This paper then applies this framework and compares two algorithm assisted decision making tools, currently in use, for adapting water and energy systems to climate change. The first tool is called “INFORM.” It is used to allocate water quantity and flow on the Sacramento River, while taking climate and weather into account. The second tool is called “RESOLVE.” It is used by energy utility regulators in California to evaluate scenarios for energy generation. Although the development of both tools involved collaborative processes, there are meaningful distinctions in the history of their development and use. The comparisons indicate that how law and policy is incorporated into the underlying code of models influences the development and regulation of climate adaptation, while inclusiveness and collaboration during the model's development influences the model's perceived usefulness and adoption. Both conclusions have implications for equity and accessibility of environmental, natural resource, and energy planning.

¹ JD, MSc (Oxon), PhD. Assistant Professor, University of Baltimore School of Law.