Advancing Environmental Justice

How PNNL applies 45 years of expertise in environmental and social science to advance environmental justice

Environmental justice—the fair treatment and meaningful involvement of all people—does not exist for all Americans because of cross-cutting, systemic barriers. PNNL provides expertise to assist federal agencies in fulfilling their mandates to achieve environmental justice in relation to their regulations, policies, programs, and projects (i.e., federal actions). This includes environmental assessment and impact analysis, economic analysis, population demographics modeling, collaborative decision-making, and stakeholder engagement. Examples of this work encompass research and analysis of energy, the environment, infrastructure investment, and emergency response issues.

EXPERTISE ASSESSING IMPACTS ON DISADVANTAGED COMMUNITIES

The federal government has renewed its commitment to ensuring that all Americans, particularly those in disadvantaged communities, receive equitable benefits and opportunities. In addition, the government has established the goal for 40 percent of the overall benefits of federal agency programs to flow to disadvantaged communities. A key step in achieving environmental justice is accurately identifying the communities that may be affected by a federal action and characterizing the potential impacts that may occur.

PNNL has proven expertise in conducting interdisciplinary assessments to examine environmental, cultural, and socioeconomic impacts of proposed actions. PNNL capabilities also include demographic models that project the U.S. population by age, gender, and spatial location, as well as economic modeling capabilities. In combination, these capabilities enable analyses of disproportionate impacts on the most vulnerable populations that may result from federal actions, environmental hazards (e.g., extreme weather events), or systemic disruptions (e.g., infrastructure failure) and subsequent identification of effective mitigation.

EXAMINING TRADE-OFFS AND IDENTIFYING MITIGATION SCENARIOS

To achieve environmental justice, agencies must identify the impacts of a federal action on disadvantaged communities and quantitatively evaluate the trade-offs between proposed actions and alternatives.

PNNL's multidisciplinary researchers have integrated advanced predictive tools that reflect the dynamics and interactions of natural and human systems. Drawing upon four decades of experience in environmental assessment, PNNL developed the ***Framework for Assessment of Complex Environmental Tradeoffs (FACET)*** to underpin socially equitable decisions based on defensible cost and benefit impact valuations and trade-off analyses. This framework is set apart from typical stand-alone decision-making tools because of its application of advanced analytics and data modeling to incorporate complex environmental factors—including climate change and extreme weather events—and diverse stakeholder perspectives to arrive at socially equitable decisions.

For example, PNNL's expertise in understanding and predicting climate change and extreme weather events was highlighted in a FACET-based assessment that included addressing long-term dynamic baseline changes and accounting for climate change and extreme weather events in decision-making. In addition, PNNL modeling tools integrating natural and human systems were used to identify the most cost-effective pollution control strategies across states for reducing mortality from air pollutants, an impact that falls disproportionately on the most vulnerable. They have also been used to evaluate trade-offs between greenhouse gas emissions reductions and progress toward Sustainable Development Goals to evaluate the fairness of emissions reduction commitments across low- and high-income countries.

CREATING MEANINGFUL STAKEHOLDER INVOLVEMENT

Successfully achieving environmental justice is contingent on full engagement with all stakeholders, in particular the disadvantaged communities that may be affected by a federal action. To be effective, such engagement must be transparent and collaborative and incorporate community perspectives, values, and needs to arrive at creative and equitable decisions.

PNNL has decades of experience in developing approaches and engaging with stakeholders and Native American Tribes. For example, a project to shape the cleanup of the Hanford Site in Washington State led to the development of a novel Native American human health risk assessment that included aspects of a traditional tribal way of life and unique tribal exposure pathways. In addition, PNNL has been instrumental in assisting federal agencies in adapting their stakeholder engagement programs to fully examine environmental justice issues.

ABOUT PNNL
Pacific Northwest National Laboratory advances the frontiers of knowledge, taking on some of the world's greatest science and technology challenges. Distinctive strengths in chemistry, Earth sciences, biology, and data science are central to our scientific discovery mission. PNNL's research lays a foundation for innovations that advance sustainable energy through decarbonization and energy storage and enhance national security through nuclear materials and threat analyses. PNNL collaborates with academia in its fundamental research and with industry to transition technologies to market.

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