CONSIDERING COMMUNITY: NEW TOOLS ALLOW UTILITIES TO CONSIDER ENVIRONMENTAL JUSTICE WHEN INVESTING IN POWER GRIDS

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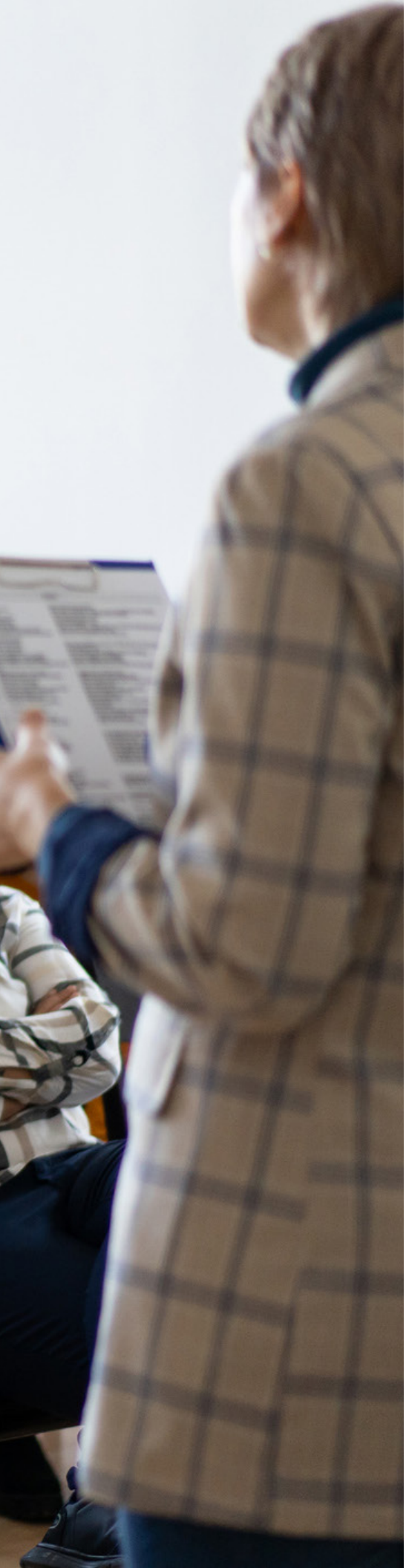

In 2023, the National Renewable Energy Laboratory (NREL) released a report outlining inequalities in grid reliability in California's Los Angeles County. The organization found that disadvantaged communities, mostly Hispanic communities, experience more frequent power interruptions than non-disadvantaged, mostly non-Hispanic communities. The study also showed that disadvantaged communities are half as likely to have underground distribution lines as other communities. A similar study by researchers at the University of Minnesota published in 2024 found that communities of color and low-income areas of the state experienced more and longer service interruptions than other areas of the state. Inequities in power distribution and electric reliability are increasingly being recognized across the country, with many states asking utilities to assess grid reliability in different communities to address such disparities.

In California, Michigan, Washington, New York, and other states, mitigating inequalities in power distribution is also at the forefront of many grid expansion and renewable energy efforts. Some utility commissions require utilities to assess any new projects or improvements to determine how they will affect disadvantaged communities, and whether they can help improve the power grid in those communities. Fortunately, there are now numerous online tools, which when coupled with statistical analysis techniques, can help utilities determine the extent to which their systems and potential projects equitably serve their customers. Using these tools and techniques can help streamline and even accelerate grid modernization and renewable energy projects while improving services in vulnerable communities.

STATES CALL FOR GREATER GRID EQUITY

The California Environmental Protection Agency (CalEPA) was one of the first state agencies to create an online tool to map contributing factors to community pollution exposure and associated vulnerabilities. In 2013, CalEPA's Office of Environmental Health Hazard Assessment (OEHHA) created CalEnviroScreen, a mapping tool that collects and displays data on environmental, public health, and socio-economic conditions in the state. The tool created a picture of the burden of pollution for vulnerable communities in California and helped stakeholders understand who might be most affected by environmental injustice — the inequitable distribution of environmental and energy benefits and burdens among communities. California utilities can use the tool to determine how their expansion projects, green energy efforts, and grid repair, maintenance, and upgrade plans affect different segments of a community. Since its release, the tool has been updated three times to include new data, maps, and environmental data from satellite and ground surveys.

In Michigan, state regulators have also ordered utility DTE Electric to perform regression analyses to understand reliability in diverse communities. The Michigan Public Service Commission (MPSC) followed recommendations from the Clean Energy Organizations, a group of nonprofit organizations consisting of the Environmental Law and Policy Center, Ecology Center, Vote Solar, and Union of Concerned Scientists. In 2023, the groups proposed using regression analysis, a statistical technique, to identify the cause of disparities in electric reliability among different communities.

Regression analysis is a method used to find and quantify relationships between sets of independent and dependent variables, and to assess whether the identified relationships are statistically significant, or unlikely to occur purely by chance. In Michigan, the Clean Energy Organizations used regression analysis to assess how different measures of electric reliability varied with demographic characteristics like race, income, and population density at the U.S. Census Tract level. The analysis revealed that low-income neighborhoods did experience more frequent and longer power outages than neighborhoods with higher household incomes. The real benefit of the regression analysis is not only to

identify the extent to which disparities exist, but also to identify the underlying causes of those disparities, such as differences in vegetation management practices, the proportion of feeders that are underground vs. overhead, or simply the age of the feeders. This allows for appropriate corrective action to be considered.

The Michigan Department of Environment, Great Lakes, and Energy has also developed an online tool, based on CalEnviroScreen, to help identify vulnerable communities. The tool, MiEJScreen, is an interactive map that lets users view how environmental conditions (both exposures and effects) and population characteristics vary across the state. MiEJScreen calculates an overall score for each census tract to indicate the cumulative effects on people's vulnerability to environmental pollution, environmental conditions, sensitive populations factors, and socioeconomic factors. Now, utilities like DTE Electric can use MiEJScreen when planning grid upgrades, maintenance, expansion, and green energy projects.

Colorado, Washington, and New York have also developed similar tools to help evaluate environmental injustice, and other states will likely follow suit. State regulators are increasingly requiring regression analysis to assess the existing provision of electricity as well as the effects of grid expansion and green energy projects. There are currently dozens of green energy projects awaiting interconnection across the country and many of these are also waiting for impact assessments.

PERFORMING ACCURATE REGRESSION ANALYSIS

Stories of the abuse of statistical analysis are common, and it is important that regression analysis in this context be careful and rigorous, notwithstanding pressures on utilities to meet regulatory deadlines and carbon-reduction goals. Regression analysis can help explain how observed differences in reliability are driven by physical characteristics of distribution grids. If environmental injustice issues arise during construction, projects can be delayed indefinitely and cost millions. Performing regression analysis during project planning can help streamline project deployment in the long term.

Even with tools like CalEnviroScreen and MiEJScreen, performing accurate and detailed regression analysis to find and describe environmental injustice can be difficult. Often census and grid reliability data only tell part of the story, and detailed analysis requires careful interpretation and potentially uncovering additional sources of data that can be used to evaluate environmental justice indicators. Indicators can help define and measure the exposure of different communities to environmental hazards and their vulnerability to associated environmental impacts. Some examples of these indicators include:

- **Exposure to environmental hazards:** This includes air and water pollution, proximity to industrial facilities, and the presence of hazardous waste sites. For instance, communities living near power plants or factories may experience higher levels of pollution.
- **Socioeconomic factors:** This includes indicators such as income levels, employment status, and educational attainment. Low-income communities often face greater environmental risks due to limited resources and lack of political influence.

- **Health vulnerabilities:** This includes the prevalence of health conditions like asthma, diabetes, and other chronic illnesses that can be exacerbated by environmental factors. For example, communities with higher rates of asthma may be more affected by air pollution.
- **Demographic factors:** These indicators look at the composition of the population, including race, age, and gender. Minority communities often face disproportionate environmental burdens.

Utilities can find additional and current sources of environmental justice indicators through government agency reports, county and city records, and environmental justice and conservation groups. In some cases, utilities may need to conduct research themselves through ground surveys, demographic studies, and person-to-person surveys.

Proactive community engagement is essential for addressing environmental justice concerns. Utilities can involve community members and stakeholders early in the planning process to identify potential risks and develop mitigation strategies. For example, an engagement session with public interest groups and regulators can help focus on the demographic characteristics of most interest — including the percent of a census tract's population comprised of people of color, the median household income, and whether communities are urban or rural.

ENVIRONMENTAL JUSTICE AND RENEWABLE ENERGY

More states are pursuing green energy, with California, Texas, Washington, Vermont, and others working toward largely renewable energy grids. Utilities can and should consider how their green energy projects might affect vulnerable communities during the planning process. Developing an understanding of distinct local values, economies, history, and previous experiences with industries and resource extraction is important to proactively addressing those communities' needs and concerns.

Mitigating environmental injustice may mean intentional changes to a project, like altering the project footprint or increasing buffer zones, changing tower or power line locations, or even redesigning the overall configuration of the site. Early stakeholder engagement can assist companies in proactively assessing and responding to concerns of vulnerable communities.

As one example, battery energy storage systems (BESS), which are key to many renewable energy projects, require their own set of safety procedures to ensure environmental justice for the communities where they reside. When they burn, they can release heavy metals and other toxins into the air and soil. The Electric Power Research Institute (EPRI) database shows that there were 63 utility and commercial and industrial-scale energy storage fires from 2011 to 2023 globally. The U.S. experienced the second highest number of major fires (behind South Korea), with a total of 19. Many utilities are choosing to locate battery stations far from any communities to limit possible harm. They are also taking precautions during setup and installation, such as building catchment systems for wastewater from fighting BESS fires or installing advanced fire suppression systems to help prevent and stop ignition.

IMPROVING THE GRID AND COMMUNITIES

There's more to environmental justice than ensuring vulnerable communities aren't exposed to harm from utilities projects. Community benefits are also a huge part of the movement and can help speed approval and development of renewable energy and grid expansion projects. New power projects may include new jobs, provide cheaper energy, improve reliability, and more. Many utilities engage with community groups, labor unions, and environmental law groups to ensure their expansion projects offer these kinds of benefits to the communities they affect.

The recent Infrastructure Investment and Jobs Act and the Inflation Reduction Act provided $1.25 trillion in funding for transportation, energy, water resources, and broadband infrastructure. To receive these funds, applicants had to submit environmental justice and community benefits plans to regulators. Similar state funding has also required reports and regression analysis, which may become more typical in the future.

Integrating environmental justice into renewable energy planning can also foster trust and cooperation between utilities and the communities they serve. By involving and proactively addressing the concerns of vulnerable

communities, utilities can work to ensure that those communities aren't — and don't feel — neglected or unfairly treated, potentially mitigating opposition and legal challenges that could otherwise arise. This approach not only helps to avoid potential conflicts and delays but also ensures that projects are more sustainable and socially responsible.

There's no doubt that the U.S. will need more power in the coming years, and many states will turn to renewable energy sources for that power. That means more construction and more area devoted to solar and wind projects. Considering communities and environmental justice during the planning process for these projects can help streamline approval and construction and ensure long-term success and resilience for the grid. These processes can also help reduce pollution and improve the lives of all those served by the grid, including those who live in disadvantaged communities. Using environmental justice tools and performing regression analysis can help demonstrate how communities have been affected by industry, power generation, climate, and more, in turn supporting processes that streamline grid modernization and green energy projects. **WE**

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