

Stefani Penn, Industrial Economics

Title: A method for analyzing air quality-related health risk inequality in Southern California and application to energy efficiency projects across California

Abstract: The 2016 Air Quality Management Plan (AQMP) for California's South Coast Air Basin (SCAB) outlines air quality control measures necessary to attain the National Ambient Air Quality Standards for both ozone and particulate matter (PM_{2.5}) between 2017 and 2031. By improving air quality, health risks including premature mortality and an array of cardiovascular and respiratory morbidities will be significantly reduced across the exposed population. However, the distribution of health risk reductions varies spatially within the region due to several factors, including emissions source locations, pollutant dispersion patterns dictated by meteorology and geography, and differences in the exposed population's susceptibility to air pollution impacts. We propose a framework to both quantify the public health benefits of the 2016 AQMP and characterize the distribution of health risk reductions resulting from its implementation. The method applies an environmental justice (EJ) screening tool derived from CalEnviroScreen to identify EJ and non-EJ communities and uses the US Environmental Protection Agency's Environmental Benefits Mapping and Analysis Program - Community Edition (BenMAP-CE) to quantify public health benefits. We combine these results to estimate changes in the distribution of premature mortality risks in the SCAB region overall and changes in risk differences between EJ and non-EJ communities as a result of implementing the 2016 AQMP. Inequality in air pollution-related mortality risk is expected to both decrease overall and decrease between EJ and non-EJ communities as a result of the 2016 AQMP. Separately, the California Energy Commission (CEC) is currently developing metrics and methods for assessing the impacts of its programs on California's disadvantaged and low-income communities; we are working on developing methods for assessing the impacts and benefits of CEC's Electric Program Investment Charge (EPIC) program, which funds energy innovation in several technical and market areas in California. A priority for EPIC funding is ensuring that funded innovations explicitly benefit the state's disadvantaged and low-income communities and populations, which are disproportionately affected by poor air quality and limited energy services (as demonstrated in the SCAQMD 2016 AQMP analysis). A challenge in measuring these impacts involves effectively adapting and scaling data from local community impacts to portfolio- and state-wide achievements and vice versa. This analysis will discuss the approaches to build on and apply the data, methods, and framework developed for the SCAQMD to help CEC effectively examine the impacts of its EPIC portfolio on California's disadvantaged communities.