

Particulate Matter: Reducing Global Solar Energy Production by Billions of \$, and Much More

Dr. Michael H. Bergin
Professor, Civil & Environmental Engineering
Duke University

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Particulate Matter (PM) has a variety of both anthropogenic (fossil fuel combustion, biomass burning, industrial), and natural (wind-blown dust, biogenic) sources. In highly polluted regions of the World, including India and China, PM deposition diminishes crop production, soils cultural heritage (such as the Taj Mahal) and in general modifies the color of the natural and built environments. Very recently we have also discovered that PM deposition to solar photovoltaics (PV's) results in a dramatic decrease in solar energy production globally. Interestingly, the influence is region specific and depends on several factors including PM concentrations, and sources. Strategies will need to be developed to optimize cleaning of solar panels, depending on location, to minimize the impact of PM deposition on solar energy production. It is not unrealistic to believe that within several years billions of dollars can be saved annually through careful placement and cleaning of solar PV's.

I will discuss *much more* related to PM. There has been a tremendous interest in developing low-cost sensors to inform the public of their exposures to harmful pollutants, including PM. There are many low-cost sensors available, and most of them do not work. We have recently developed, evaluated and deployed sensor packages in many locations throughout the World and I will discuss our results including field evaluations of our sensors. In particular, I will focus on a study in Shanghai, China involving asthmatic children and the ability of indoor filtration to improve their health. Lastly, I will talk about assessing the impact of environmental pollutants on human health by mining social media. This is an amazingly exciting topic, given the vast amount of data available globally, and the potential for such information to supply real-time health impacts of environmental pollutants including PM. I believe linking low-cost pollutant measurements with social media based health impacts will lead not only to modifications in our behavior but also in knowledge of the sources that impact our health and public-driven action.