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Connecting Air Quality and Health in Energy Equity

Dear Commissioners,

I am an air quality scientist at PSE Healthy Energy with expertise in atmospheric chemistry and regional air quality modeling. My published work includes modeling air quality in California and assessing the health impacts associated with air pollution exposure.

I was glad to see that the Energy Equity Indicators (EEIs) Phase 2 plan commits to finer spatial-granularity and considers equity based on how impacts are distributed, rather than relying solely on location-level averages. I would like to submit the following comments to recommend that this same principle be applied to the health dimension of the EEIs.

In the Phase 2 plan, health is identified as a supplementary metric, but there is limited detail on how spatially resolved air pollution information will be incorporated into this dimension. The health impacts of energy-related air pollution are highly dependent on spatial distribution of pollutant levels and population exposure. Pollutant concentrations, including PM2.5 and ozone, can vary significantly over short distances due to local emission sources, meteorological conditions, and atmospheric chemical processes. Estimates based on coarse or averaged concentration fields often fail to accurately capture the actual distribution of health impacts. I suggest two complementary approaches moving forward.

As a near-term improvement, the metric of "avoided air pollutants" could be broken out by pollutant type, given that different pollutants (such as PM2.5, NOx, and ozone) vary in terms of health impacts, spatial behavior, and emission sources. This task could leverage existing monitoring data from the California Air Resources Board (CARB) and the U.S. Environmental Protection Agency (EPA), potentially supplemented by low-cost sensor networks, to better understand the spatial patterns of pollutants across regions and to track how mitigation measures or new developments affect emissions.

Monitoring data alone, however, cannot fully reflect how energy policy changes will affect future air quality, because emissions do not always translate directly into concentrations. For pollutants such as PM2.5 and ozone, concentrations are influenced by nonlinear atmospheric chemistry and do not change proportionally with emissions. Capturing this behavior with high spatial resolution and rapid computation presents a challenging combination for any single modeling approach, as the tools that best represent nonlinear chemistry are typically too computationally expensive, whereas faster tools often have to sacrifice resolution or accuracy. I recommend that CEC invest further in developing complementary modeling approaches tailored to Californiaâ€™s

specific geographic, meteorological, and emissions characteristics. Combining high-fidelity simulations with rapid, efficient techniques would help capture underlying chemical processes while resolving the finer-scale spatial details required for equity analysis. This would allow CEC to identify areas where the energy transition can have the greatest health benefits.

Thank you for your work and for the opportunity to comment.

Respectfully,
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PSE Healthy Energy