

Response to D. Henderson, B.E. Koenig, and P.L. Mokhtarian, "Using Travel Diary Data to Estimate the Emissions Impacts of Transportation Strategies: The Puget Sound Telecommuting Demonstration Project," January 1996

Dear Editor:

Henderson et al., *J. Air & Waste Manage. Assoc.* 1996, 46, 47-57, calculate the emission benefits of telecommuting based on EMFAC emission modeling. They go on to state that: "Future research will benefit from improvements to the EMFAC/BURDEN models." Unfortunately, actual (as distinct from modeled) emission reductions are likely to be seriously overpredicted. Even supposing that the EMFAC Model is a perfectly accurate predictor for all technology classes and model years, it is designed to predict the mean emissions. The uncertainty arises because emissions are not normally distributed and the median emissions are typically much lower than the mean (about one fifth for CO and one half for HC; Zhang et al., *Env. Sci. Technol.* 1995, 29). Most people drive vehicles with median emissions or below. Thus, if there is a non-random selection bias imposed by the telecommuters, it is likely that their emission reductions will be at a lot lower than modeled. Two possible sources of such a bias include the concept that telecommuters are environmentally concerned, or have higher than average income. Both of these would lead them to drive a median, not a mean, car with a consequent dramatic loss of actual emission reductions.

Yours sincerely,

Donald H. Stedman  
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University of Denver

## AUTHORS' RESPONSE

Dear Editor:

We wish to respond to Donald Stedman's letter regarding our recently published paper, Henderson et al., *J. Air & Waste Manage. Assoc.* 1996, 46, 47-57. Professor Stedman's stated concern is that "actual emissions reductions are likely to be seriously overpredicted" due to the emissions modeling methodology employed. This concern would be more serious if we were calculating emissions reductions by comparing (unrepresentative) telecommuters' travel to that of a (representative) control group. But that is not what we do. Rather, we estimate emissions reductions by comparing telecommuters' travel on non-telecommuting-days to their travel on telecommuting-days. It is reasonable to assume that any selection bias affecting the model outputs would affect both types of days comparably, and hence that percent reductions would be reasonably valid. We do stress that due to known inaccuracies in the model, more attention should be paid to percent reductions than to absolute emissions levels. We also stress that even the percent reductions are very much dependent on total VMT, which may differ from setting to setting. Therefore, these results should be taken for what they are—the outcome of one small empirical study—not as a definitive measure of the emissions impacts of telecommuting. However, the findings are still instructive, and indicative of what to look for in future studies on larger, more diverse samples of telecommuters.

Sincerely,

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Patricia L. Mokhtarian  
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### LETTERS TO THE EDITOR

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