



Review and Comments

“Home is Where the Pipeline Ends: Characterization of Volatile Organic Compounds Present in Natural Gas at the Point of the Residential End User,” *Environmental Science & Technology*, June 28, 2022

Rev 2022.06.29

In June 2022, the journal *Environmental Science & Technology* published "Home is Where the Pipeline Ends: Characterization of Volatile Organic Compounds Present in Natural Gas at the Point of the Residential End User " (Michanowicz et al. 2022). The following Review and Comments present several points and observations based on an AGA review of the study.¹

- The Michanowicz et al. article identifies no cause for health concerns related to natural gas use.
- The study measured concentrations of different constituents of natural gas, including trace amounts of volatile organic compounds (VOCs). The levels of VOCs reported in the study are reassuringly low, and each VOC detected was at levels of <0.0001%.
- The gas industry routinely tests natural gas to determine its constituents, including methane, ethane, propane, and butane content. Prior research has shown that natural gas contains only trace amounts of volatile organic compounds. The data from this new study is generally consistent with these prior studies.
- The study measured samples of natural gas taken from end-use appliances. The study did not conduct direct measurements of fugitive natural gas emissions.
- The authors state that VOC concentrations in the natural gas sampled "are likely lower compared to other source types" such as household chemical products, including pesticides, coatings, adhesives, cleaning agents, and personal care products. For more information, see the list compiled by the New Jersey Department of Environmental Protection: [Common Household Sources of Background Indoor Air Contamination \(nj.gov\)](https://www.nj.gov/dep/air/contamination/background/).
- Given the very low levels of VOCs found in natural gas, the temporal and spatial variabilities of VOCs measured and reported by the authors are primarily of academic interest.

¹ Michanowicz, Drew R., et. al. "Home is Where the Pipeline Ends: Characterization of Volatile Organic Compounds Present in Natural Gas at the Point of the Residential End User" *Environmental Science and Technology*. June 28, 2022. <https://pubs.acs.org/doi/full/10.1021/acs.est.1c08298>

- The reported levels of benzene measured in natural gas are below conservative health-based screening levels.
 - As discussed by the authors, if natural gas were emitted into a room to a level where residents detect odors, there would be approximately 21.3 parts per million (ppm) of methane in the space. But they go on to state that the concentration of trace components of natural gas, such as benzene, would be only 0.004 parts per billion (ppb). The levels reported of benzene are also only a tiny fraction of the typical background levels of benzene in outdoor and indoor air.
 - While the calculated level of benzene would be larger than 10 out of 35 sectors, those 10 sectors are all negligible sources of emissions on the inventory; indeed, even the high end of the benzene range estimated by the authors (327 kg) is only 0.0387% of the total benzene emissions inventory.
- All the natural gas samples measured in the study reported odorant (TBM) thresholds that meet federal regulations and Massachusetts odorization guidelines.