



Comparison of Air Quality Impact from Resynergi's Demonstration Facility at SOMO Village to that of a Standard Fast-Food Drive Thru

What Resynergi's Technology Really Does

Resynergi's patented **AMP** system (Accelerated Microwave Pyrolysis) is designed as a **safe alternative** to incineration and as a circular economy solution for the types of plastics that normally end up in landfills.

Both AMP and incineration involve heat, but incineration also involves fire and smoke, which AMP does not. Nevertheless, the Air District does not have emission factors for AMP because it is a new technology. Therefore, the Air District used emission factors for incineration, assuming this was the best surrogate available. Because AMP does not involve fire or smoke, this turns out to be a conservative assumption and overstates AMP emissions significantly.

This can be seen by comparing the Air District's emission-factor-based emission estimates to the actual measurements of emissions from Resynergi's ¼-scale R&D AMP Unit that was decommissioned in September 2024 after over 10,000 hours of testing (see table below).

The table compares (1) the Air District's emission-factor-based emission estimates for the full-scale Demonstration AMP Unit, including Hazardous Air Pollutants (HAPs) that were flagged as "of-concern" by the public, that has not yet operated, (2) the detected HAP emissions from the ¼-scale R&D AMP Unit, and (3) calculated estimates – based on published literature sources – of the HAP emissions from a typical drive-through fast food restaurant. Data sources, assumptions, discussion of data, and calculations can be found on our website (see QR code).



Chemical	Estimated Emissions from one fast food restaurant (lbs/yr)	BAAQMD or EPA "assumed incinerator" + Actual emissions data production rate (lbs/yr) Bay Area Air Quality Management District, 2025	Resynergi production rate at emission point, actual sample data (lbs/yr)
1,3-butadiene*	0.41539565	0.12180000	0.12180000
Acetaldehyde	0.38796386	0.00000308	Not Detectable
Acrolein	0.195941346	0.00000193	Not Detectable
Benzene	0.50944750	0.00000572	Not Detectable
Ethyl benzene	0.01959413	0.00000679	Not Detectable
Formaldehyde	1.70468972	0.00015800	Not Detectable
Hexane	0.09797067	0.00000451	Not Detectable
Naphthalene	4730.43918800	0.00000044	Not Detectable
Particulate Matter (PM)	3081.91339400	381.90000000	Not Detectable
Styrene	0.25864257	0.00000000	Not Detectable
Toluene	0.47809688	0.00002621	Not Detectable
Xylenes	0.07837653	0.00001949	Not Detectable

*From actual emissions data

References

- Bay Area Air Quality Management District. (2025). *Draft Engineering Evaluation CA-002 Somo Village (Resynergi)*. Bay Area Air Quality Management District. https://www.baaqmd.gov/~media/files/engineering/public-notice/2025/704470/fid203504_nsr_704470_eval_071825-pdf.pdf?rev=11ecccc340042a09b30cd5817e00211&sc_lang=en
- Going, P. B., Schukoske, E. B., & Atlantic Traffic & Design Engineering, LLC. (2022, April 8). *Proposed McDonald's Drive-Thru Improvements 726 Connecticut Avenue (US Route 1)*. Proposed McDonald's Drive-Thru Improvements. <https://www.norwalkct.gov/DocumentCenter/View/26862/ATB22001000-Letter-Report-2022-04-08#:~:text=In%20the%20proposed%20condition%2C%20the,the%20City%20requirement%20for%20parking>
- Heeb, N. V., Forss, A.-M., & Weilenmann, M. (2002, October). Pre- and post-catalyst-, fuel-, velocity- and acceleration-dependent benzene emission data of gasoline-driven EURO-2 passenger cars and light duty vehicles. *Atmospheric Environment*, 36(30), 4745-4756. 10.1016/S1352-2310(02)00562-9
- Huang, T., & GANDDINI GROUP, INC. (2021, June 25). *In-N-Out at 1830 Cleveland Avenue Project Focused Traffic Analysis*. In-N-Out Traffic Study. <https://www.madera.gov/wp-content/uploads/2022/02/In-N-Out-Traffic-Study-FINAL.pdf>
- In-n-Out, Inc. (2025). *In-n-Out Menu*. In-n-Out, Inc. <https://www.in-n-out.com/menu>
- Marquez, B., Kostenidou, E., Valiente, A. M., Vansevenant, B., Sarica, T., Fine, L., Temime-Roussel, B., Tassel, P., Perret, P., Liu, Y., Sartelet, K., Ferronato, C., & D'Anna, B. (2022, April 8). Detailed Speciation of Non-Methane Volatile Organic Compounds in Exhaust Emissions from Diesel and Gasoline Euro 5 Vehicles Using Online and Offline Measurements. *Toxics*, 10(4), 184-204. 10.3390/toxics10040184
- McDonald, J. D., Zielinska, B., Fujita, E. M., Sagebiel, J. C., Chow, J. C., & Watson, J. G. (2012, February 22). Emissions from Charbroiling and Grilling of Chicken and Beef. *Journal of the Air & Waste Management Association*, 53(2), 158-194. 10.1080/10473289.2003.10466141
- Moussa, S. G., Leithead, A., Li, S.-M., Chan, T. W., Wentzell, J. J.B., Stroud, C., Zhang, J., Lee, P., Lu, G., Brook, J. R., Hayden, K., Narayan, J., & Liggio, J. (2016, April). Emissions of hydrogen cyanide from on-road gasoline and diesel vehicles. *Atmospheric Environment*, 131(1), 185-195. 10.1016/j.atmosenv.2016.01.050
- Rowe, C. D., & KIMLEY-HORN AND ASSOCIATES, INC. (2023, August 8). *McDonald's – Parker Stroh 3 Traffic Compliance Letter Parker, Colorado*. McDonald's – Parker Stroh 3 Traffic Compliance Letter Parker, C. <https://prkc-trk.aspgov.com/eTRAKiT/viewAttachment.aspx?Group=PROJECT&ActivityNo=SP23-070&key=ECO%3A23082804570161#:~:text=DRIVE%2DTHROUGH%20QUEUEING%20ANALYSIS,onsite%20within%20the%20drive%20aisle>
- Schmitz, T., Hassel, D., & Weber, F.-J. (2000). Determination of VOC-components in the exhaust of gasoline and diesel passenger cars. *Atmospheric Environment*, 34(27), 4639-4647. 10.1016/S1352-2310(00)00303-4
- Sultana, D., Hoover, S., Office of Environmental Health Hazard Assessment (OEHHA), & California Air Resources Board (CARB). (2018, January 24). *GASOLINE-RELATED AIR POLLUTANTS IN CALIFORNIA TRENDS IN EXPOSURE AND HEALTH RISK 1996 TO 2014*. State of California OEHHA. <https://oehha.ca.gov/air/report/gasoline-related-air-pollutants-california-trends-exposure-and-health-risk-1996-2014>
- United States Environmental Protection Agency. (2020, November). *Speciation of Total Organic Gas and Particulate Matter Emissions from Onroad Vehicles in MOVES3* (EPA-420-R-20-021 ed.). National Service Center for Environmental Publications (NSCEP). <https://nepis.epa.gov/Exec/ZyNET.exe/P1015DTF.TXT?ZyActionD=ZyDocument&Client=EPA&Index=2016+Thru+2020&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&Xm-lQuery=&>
- U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES & Frieden, T. R. (2010). *TOXICOLOGICAL PROFILE FOR STYRENE*. Agency for Toxic Substances and Disease Registry. <https://www.atsdr.cdc.gov/toxprofiles/tp53.pdf>
- User, D. (2022, October 1). *How many burgers does a busy store sell in one day? : r/innout*. Reddit. Retrieved August 18, 2025, from https://www.reddit.com/r/innout/comments/xsjyby/how_many_burgers_does_a_busy_store_sell_in_one_day/
- User, S. (2020, May 21). *Fat % of meat patties? : r/innout*. Reddit. Retrieved August 18, 2025, from https://www.reddit.com/r/innout/comments/gno-j5l/fat_of_meat_patties/
- Woo, S.-H., Jang, H., Lee, S.-B., & Lee, S. (2022, October 10). Comparison of total PM emissions emitted from electric and internal combustion engine vehicles: An experimental analysis. *Science of The Total Environment*, 842(10). 10.1016/j.scitotenv.2022.156961
- Zhu, X., Durbin, T. D., Norbeck, J. M., Cocker, D., Bourns College of Engineering-Center for Environmental Research and Technology, & University of California, Riverside. (2004, July). *Internal Combustion Engine (ICE) Air Toxic Emissions*. California Air Resource Board. <https://ww2.arb.ca.gov/sites/default/files/classic/research/apr/past/02-334parta.pdf>

