



AIR-TRO HEATING & AIR CONDITIONING

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October 14, 2024

SCAQMD

ATTN: Peter Campbell

Via email at:

pcampbell@aqmd.gov

21865 Copley Dr.

Diamond Bar, CA 91765

SUBJECT: PAR 1111 & PAR 1121

Dear Mr. Campbell:

The purpose of this letter is to comment on Proposed Amended Rules (PAR) 1111 and 1121. The proposed changes to PAR 1111 and PAR 1121 are flawed to the point of being unworkable. They will not improve air quality within the District, but they will inflict significant economic harm to the residents of the District.

My credentials on the topic come from being a fourth-generation contractor, a third generation engineer with a B.S. in Mechanical Engineering from the California Institute of Technology (Caltech), 30 years as owner and manager of a \$15 million HVAC firm (Air-Tro, Inc.), past President of the Institute of Heating and Air Conditioning Industries (IHACI) as well as past President of the Monrovia Chamber of Commerce. This has given me practical experience, academic and technical education, and decades of work within the community as a tradesman, advocate and industry leader.

The proposed changes ignore basic scientific facts about ozone formation. The economic analysis is based on bad numbers. And the conclusions are made in defiance of recent court cases that deny local agencies the power to ban gas appliances. Staff should withdraw these proposals and rework them using better scientific models and more accurate economic projections and with a consciousness of legal limits to SCAQMD authority.

PAR 1111 and PAR 1121 ban the sale of gas appliances for comfort heating and water heating on the basis that these appliance emit oxides of nitrogen (NOx) which are precursor chemicals to ozone. Ozone is a major component of smog, and ozone levels in the District routinely exceed EPA limits.



However, gas appliances don't emit very much NOx. The District sees close to 400 tons of NOx emissions daily. Of that total, only about 10 tons (or about 2.5%) come from gas furnaces and water heaters. By way of comparison, a single container ship by itself emits just over 10 tons of NOx daily (assuming a 40,000 kw power plant emitting 10g/kwh).

Not only that, but the small amounts of emissions from these units occurs when ozone formation is already at its lowest level due to natural conditions. NOx also does not create ozone by itself. It requires energy from solar ultraviolet rays to break off oxygen ions from N₂O. These free oxygen ions then combine with oxygen molecules to form ozone. The more sunshine, the more ozone. We can see this if we look at SCAQMD data for peak ozone days at their Rubidoux Riverside sampling station, which records some of the worst ozone conditions in the district. (Attachment #1). All occurrences where ozone levels exceed the EPA's one-hour limit (90 parts per billion) take place on afternoons where high mean outdoor temperatures exceed 84°.

What are these units doing when natural conditions favor ozone creation? They aren't running. Furnaces operate on cold winter nights, not hot summer afternoons. The highest ozone level in the dataset is 139 ppb on August 29 at 2pm, on a 103° day, and we can be assured no one had their furnace running when it's 103° out. Water heating is more distributed, but domestic hot water is most in demand in the early morning or early evening for use in showers, laundry, and washing dishes. Few people shower at 2pm.

In short, PAR 1111 will achieve *no* changes in peak ozone levels, and PAR 1121 will have an impact too small to be measured. Neither rule will bring district ozone closer to EPA compliance.

The economic calculations provided by staff are equally flawed. A ban on gas furnaces and water heaters will force customers to rely on electrically driven heat pumps. By the calculations of district staff (Slide #25 of the Working Group #4 presentation, available at <https://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1111-and-1121/par-1111-and-1121-wgm4-april-2024.pdf?sfvrsn=14>), residents currently pay the gas company 6¢ per kilowatt-hour of energy while electricity costs 26¢/kwh, over 4 times as much. That 26¢/kwh estimate is far too low. As an Edison customer, I currently pay winter rates of 43¢/kwh (Attachment #2). In addition, on that same slide district staff assumes that gas prices will rise 50% while electricity will only go up 21%. In fact, the CEC's Integrated Energy Policy Report California Energy Commission Report cited by staff (<https://efiling.energy.ca.gov/GetDocument.aspx?tn=254463>) predicts "gas price projections out to 2050 remain relatively steady," while Edison has requested a 46% electricity rate hike by 2028 (<https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/news-and-outreach/documents/pao/customer-notices/cn-2023/sce-grc-2025--a2305010--final.pdf>). That will take rates from 43¢/kwh to 63¢/kwh, more than ten times the 6¢/kwh cost that same amount of energy costs when purchased as natural gas. Increasing energy costs by a factor of ten is an unconscionable burden on the communities that make up the district.

In addition, district staff overestimate the energy efficiency of heat pump technology. One of the major benefits of heat pumps is that they don't create heat. Instead they move it (or pump it). They capture outdoor heat and bring it inside to heat the home (or the home's hot water). As a



result, for every kilowatt of energy used, several kilowatts of heat result. The ratio of heating to consumption is called the COP (coefficient of performance). Unfortunately for their analysis, district staff assumed a COP of 5, or five times as much heat is generated for every unit of energy consumed. There are indeed heat pumps capable of this high level of performance. They are called “ground source heat pumps” and rely on coiled heat exchangers buried or submerged below grade to use soil or water as a heat source. Such systems are used successfully in other parts of the country, but to function they need at least a half-acre of land or an adjacent water feature such as a lake or pond.

There are few residential lots of such size or with access to such water features within the district. Even for homes with large lots, the cost of trenching to lay the lines runs into the tens of thousands. Trenching for typical ground source heat pump system in the Midwest can run over \$50,000. It’s hard to imagine what the cost would be in Southern California, which has some of the highest construction costs in the nation. It’s also unclear if such work could even be permitted; no local building department has the expertise to oversee such work.

Air source heat pumps, on the other hand, are frequently installed in Southern California. These require no trenching or other exotic techniques. In fact, they look and operate just like residential central air conditioning units. But their efficiencies don’t match ground source models. The very best air source heat pumps have COPs of 3 (or just a bit less). By using a COP of 5 rather than 3 district staff overestimated heat pump performance and underestimated energy use by 66%. Combine this with the miscalculated electricity rates, and calculated costs for one kwh of heat rises from staff estimates of 6¢/kwh to an expected cost of 21¢/kwh, or three and a half times higher.

Similar errors exist in district staff’s estimates of first costs. They used historical information from the TECH fuel swapping program for the cost of a heat pump installation, which yielded a figure of \$7,000 for installation. But the majority of heat pumps installed under that program were mini ductless systems. The majority of furnaces installed in the district are for ducted central heating systems. Replacing these with ducted heat pumps would cost at least \$15,000 and that presumes no major electrical upgrades are needed. A new electrical service would add another \$5,000 to \$8,000.

District staff similarly used incorrect numbers to estimate expected equipment life. They used estimates of TECH staff that heat pumps and furnaces have similar lifespans of about 20 years. However, furnaces only run in the winter while heat pumps provide summer cooling as well as winter heating. The increased run time means increased wear and tear, and in fact heat pumps only last 10 to 15 years. This raises life cycle costs from staff estimates of \$350/yr (\$7,000 divided by 20 years) to actual costs of either \$1,000/yr (\$15,000 divided by 15 years) or \$1,330/yr if electrical improvements are needed. Again, costs will prove to be three to four times higher than staff estimates.

Staff frequently refer to a proposed “Go Zero” rebate program being offered to disadvantaged communities or homeowners to help mitigate these costs. The proposed funding of \$50 million will not go far in a District with 17 million residents; the funding amounts to about \$3/resident.



Let's touch briefly on the legal issues, with SCAQMD potentially embarrassing itself through regulatory overreach. In 2019 the city of Berkeley banned gas hookups to new structures built within their city. Within two years dozens of other California cities and counties passed similar bans. The California Restaurant Association sued to overturn the ban and earlier this year prevailed before the Ninth Circuit Court of Appeals. The court ruled that the only authorities that can issue such a ban are the US Congress and the Federal Department of Energy. If the district moves forward with this ban, they can expect to see it swiftly overturned by the courts.

If the Board approves PAR 1111 and 1121, the response from industry trade groups like PHCC (Plumbing, Heating and Cooling Contractors) and AHRI (American Heating and Refrigeration Institute) will likely be swift. SCAQMD will likely find itself in prolonged, expensive and ultimately embarrassing legal action, seeing its efforts set aside by the Federal courts.

In short, PAR 1111 and 1121 are based on poor science, flawed economics and bad law. This board should withdraw this proposal from consideration before it imposes massive replacement costs and electric bills on the community with no resulting improvement in air quality, or before it suffers an embarrassing legal defeat.

If you have any questions or wish more background information, feel free to call me at (626) 357-5315 x14 or email me at bobhelbing@airtro.com

Sincerely,



Robert Helbing
President

