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ENVIRONMENT
& HEALTH

Mr. Michael Krause
Assistant Deputy Executive Officer
South Coast Air Quality Management District
21865 Copley Dr.
Diamond Bar, CA 91765

SCAQMD PROPOSED RULE 1153.1
EMISSIONS OF OXIDES OF NITROGEN FROM COMMERCIAL FOOD OVENS
COMMENTS ON PROPOSED RULE

Dear Mr. Krause:

Ramboll appreciates the opportunity to participate in the Working Group Meetings (WGMs) for South Coast Air Quality Management District (SCAQMD or District) Proposed Amended Rule 1153.1 (PAR 1153.1), Emissions of Oxides of Nitrogen from Commercial Food Ovens. This rulemaking is being undertaken to (1) transition facilities in the REgional CLean Air Incentives Market (RECLAIM) program for NOx emissions to a command-and-control structure requiring Best Available Retrofit Control Technology (BARCT) level controls as soon as practicable, as required by Control Measure CMB-05 of the 2016 Air Quality Management Plan[1] (AQMP), and (2) reduce NOx emissions from existing food ovens at non-RECLAIM facilities. On March 17, 2023, SCAQMD released preliminary draft rule language and a preliminary draft staff report (PDSR) for PAR 1153.1. On behalf of our clients who are directly impacted by PAR 1153.1, Ramboll offers the following comments the PAR 1153.1 rulemaking and the District Staff's associated analysis.[2,3]

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Ramboll
350 S Grand Avenue
Suite 2800
Los Angeles, CA 90071
USA

T +1 213 943 6300
F +1 213 947 1116
www.ramboll.com

1. **Ramboll strongly recommends that Governing Board consideration of PAR 1153.1 needs to be delayed to allow District staff sufficient time to complete the required technical analyses and provide stakeholders sufficient time to evaluate the proposed rule. While the PAR 1153.1 rulemaking has been in process since 2021, a significant change in the control strategy was only introduced in February 2023. The required District technical analyses for this significant change are still evolving and incomplete. Stakeholders must be given adequate time to understand the District's proposed ZE technology mandate, the supporting technical rationale, and to provide appropriate comments.**

[1] SCAQMD Final 2016 Air Quality Management Plan, March 2017. Available at: https://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/final2016aqmp.pdf?sfvrsn=15.

[2] SCAQMD PAR 1153.1 Preliminary Draft Rule Language. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1153-1/preliminary-draft-par-1153-1---march-2023.pdf?sfvrsn=6.

[3] SCAQMD PAR1153.1 Preliminary Draft Staff Report. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1153-1/preliminary-draft-staff-report-par-1153-1---march-2023.pdf?sfvrsn=6.

SCAQMD held Working Group Meetings (WGMs) between July 2021 and September 2022 to allow stakeholders the opportunity to discuss and provide feedback on PAR 1153.1 prior to a public workshop held on October 6, 2022.[4] At the October 2022 public workshop Staff presented proposed NOx emission limits of 30 ppm for all equipment categories with the exception of tortilla ovens heated solely by infrared burners, which would be subject to a 15 ppm limit.[5] In the February and March 2023 WGMs, SCAQMD presented an abrupt change in the BARCT approach which would mandate replacement of commercial food ovens for several categories of equipment, by proposing that bakery ovens, cooking ovens, drying ovens, and smokehouse ovens should meet a BARCT limit of 0 ppm using ZE technologies (i.e., electric ovens).[6,7] Only after the last working group meeting was held in March 2023 did Staff release preliminary draft rule language which added tortilla ovens and roasters to that list, proposing a 0 ppm endpoint.

Obviously, the most recent preliminary draft rule language is **dramatically different** from the proposal presented to stakeholders in 2022. The new proposal presents electrification mandates for all categories of equipment, including categories for which District staff openly acknowledge **there is no commercially available product**.

In Ramboll's experience, it is highly unusual for the District to release draft rule language with no opportunity for stakeholder discussion or comment. In this case, there have been significant changes impacting operators of tortilla ovens and roasters with no opportunity for the impacted stakeholders to review the technical assessment or make comments. Additionally, the District failed to present cost-effectiveness results for tortilla ovens or roasters in the PDSR. Staff offered cost-effectiveness values for the first time at the Public Workshop held on March 30, 2023, but has not provided stakeholders any information to support those values.

Given these facts, Ramboll strongly recommends that SCAQMD return to the PAR 1153.1 Working Group to allow stakeholders the opportunity to review and comment on the District's proposal.

2. **SCAQMD has not completed the technical analyses required under the California Health & Safety Code (H&SC) for establishing new BARCT limitations. Specifically, the District have failed to demonstrate that the proposed control measures are technically feasible and/or cost effective for each class and category of equipment covered by the rule. SCAQMD must complete the BARCT assessments for each class and category of equipment and revisit the proposed compliance timelines as they directly impact the technical feasibility and cost effectiveness conclusions.**

   The California Health & Safety Code (H&SC) defines BARCT as "an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and

[4] SCAQMD PAR 1153.1 Rulemaking Schedule and Documents. Available at: http://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1153-1.

[5] SCAQMD PAR 1153.1 Public Workshop, October 6, 2022. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1153-1/par-1153-1-public-workshop-presentation.pdf?sfvrsn=7.

[6] PAR 1153.1 WGM #6. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1153-1/par-1153-1-wgm-6.pdf?sfvrsn=6.

[7] SCAQMD PAR 1153.1 WGM #7. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1153-1/par-1153-wgm7-presentation.pdf?sfvrsn=18.

economic impacts by each class or category of source."[8,9] The H&SC defines cost-effectiveness as "the cost, in dollars, or the potential control option divided by the emission reduction potential, in tons, of the potential control option."[10] If the cost per ton of emissions reduced is less than the established cost-effectiveness threshold, then the control method can be considered to be cost-effective. Cost-effectiveness evaluations need to consider both capital costs (e.g., equipment procurement, shipping, engineering, construction and installation) and operating costs (e.g., utilities, labor, and replacement).

There are significant direct costs related to Phase II and Phase III implementation that Staff have failed to consider over all categories. Additionally, for tortilla ovens and roasters, the zero emission endpoints proposed by PAR 1153.1 would require facilities to comply with emission limits that **the District has not demonstrated to be technically feasible or cost-effective**.

Staff acknowledged the following in WGM 6:[11]

> *"Staff did not identify any zero-emission/electric tortilla ovens suitable for commercial production…*
>
> ***Burner replacement to achieve 15 and 30 ppm is the only feasible option** identified at this time" [Emphasis added]*
>
> and
>
> *"Staff did not identify any large zero-emission commercial roaster for industrial operations…*
>
> ***Burner replacement to achieve 30 ppm is currently only feasible control option** for category" [Emphasis added]*

SCAQMD has also stated:[12]

> *"The Phase II and Phase III Emission Limits are technology forcing limits, meaning the limits are **based on technology that is not widely available at the time of rule adoption**." [Emphasis added]*

There are currently no known commercially available tortilla ovens or roasters on the market. The compliance schedule presented in the current version of the draft rule could subject certain facilities to Phase III electrification mandates as soon as 2030. That schedule would require R&D, and commercialization of the required technology within less than 6 years' time.

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[8] California Health & Safety Code §40440. Available at: https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=HSC&division=26.&title=&part=3.&chapter=5.5.&article=4.

[9] California Health & Safety Code §40406. Available at: https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=40406.&lawCode=HSC#:~:text=40406.,class%20or%20category%20of%20source.

[10] California Health & Safety Code §40920.6. Available at: https://codes.findlaw.com/ca/health-and-safety-code/hsc-sect-40920-6.html.

[11] SCAQMD PAR 1153.1 WGM #6. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1153-1/par-1153-1-wgm-6.pdf?sfvrsn=6.

[12] SCAQMD PDSR. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1153-1/preliminary-draft-staff-report-par-1153-1---march-2023.pdf?sfvrsn=6.

Ramboll is also concerned that the proposed compliance schedule would not provide sufficient time for other activities necessary to deliver such equipment into a facility. These would include:

- Project planning, engineering and construction.
- Procurement of additional electrical capacity from the electric utility.
- Electric utility engineering, permitting and construction of any needed electric distribution infrastructure, engineering.
- Permitting and construction of necessary electric systems on the facility's side of the utility meter.

The current draft of PAR 1153.1 contains very prescriptive deadlines for decommissioning of existing (gas-fired) equipment based on oven and burner age and does not provide alternatives for situations where the desired ZE technologies do not become available fast enough to meet the implementation timelines specified under the rule.

Regarding technical feasibility SCAQMD has stated:

> *"Follow up discussions with commercial food oven manufacturers and industry stakeholders identified that certain types of ovens may potentially have challenges when attempting to electrify due to the oven format, size, design, and construction.* ***Staff is continuing to evaluate the technical feasibility for these types of ovens****."* [Emphasis added]

Implementation of these ZE technical BARCT endpoints (i.e., Phase II and Phase III) would therefore violate SCAQMD's obligations under the H&SC to identify technologies that are technically feasible and cost-effective.

3. **In addition to these problems with the technical feasibility demonstration, Staff have failed to consider significant direct costs related to PAR 1153.1 for most oven categories. SCAQMD is applying the health benefit-based cost-effectiveness threshold established in the 2022 AQMP. That threshold attempts to account regional public health benefits in determining cost effectiveness. In that event, the District must use a cost methodology that considers regional costs as generally outlined in the USEPA Guidelines for Preparing Economic Analyses. The cost-effectiveness analysis should be updated to consider all regional costs, as well as costs borne by the facility for replacement of natural gas fired ovens with electric ovens.**

   With PAR 1153.1, the District is attempting to apply a new health benefit-based cost-effectiveness threshold of $325,000 per ton of NOx emissions reduced for BARCT rules, as established in the 2022 AQMP.[13] The health benefit-based cost effectiveness threshold considers projected regional level public health benefits resulting from regional air quality improvements; therefore, costs should also be evaluated on a regional basis. However, SCAQMD has not established an appropriate methodology for calculating regional costs. The USEPA Guidelines for Preparing Economic Analyses (Guidelines) establishes a framework for performing economic analyses of environmental regulations

[13] SCAQMD 2022 AQMP. Available at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/final-2022-aqmp/final-2022-aqmp.pdf?sfvrsn=16.

and policies.[14] The costs to be included in such analyses include explicit and implicit costs, direct and indirect costs, and private sector and public sector costs.

The cost analysis presented by the District for PAR 1153.1 fails to account for most of these costs, and even fails to include all of the direct costs which would be borne by a facility complying with PAR 1153.1. For example, the District has made no attempt to consider electric utility service upgrades that would be necessary to support the mandated replacement of existing natural gas-fueled ovens with new electric ovens. These costs must be considered when assessing the cost-effectiveness for each category, otherwise the cost-effectiveness analysis is defective.

4. **Many of the existing ovens will need to be retrofit with new burners to meet Phase I emission limits. SCAQMD has stated that the cost-effectiveness analysis for burner replacement uses a 25-year useful life. But under Staff's current proposal, equipment with newly replaced burners would only be allowed to operate a maximum of 10 years before being forced to comply with Phase II or Phase III limits. Therefore, the District's cost-effectiveness analysis for Phase I limits must be revised to assume a 10-year useful life.**

   SCAQMD performed a technology assessment on equipment subject to Rule 1153.1, stating:[15]

   > *"Further review of additional permit information, facility survey data, and source test data confirmed that approximately 131 out of the 202 food ovens were already performing below the 30 ppmv level…"*

   This indicates that 35% of the existing units may need to be retrofit with low NOx burners to meet the proposed Phase I limits. The BARCT cost-effectiveness analysis presented in the preliminary draft staff report states:[16]

   > *"The useful for the burner control equipment was assumed to be 25 years"*

   The compliance deadlines presented in Section (e) of the proposed rule require facilities to submit permit applications to meet Phase II and Phase III emission limits when the burners reach 10 years of age. It is therefore inappropriate to do the cost-effectiveness analysis for burner replacement for all equipment based on a 25-year lifetime. Staff must therefore identify which units would need to be replaced within 10 years of burner replacement and redo the Phase I cost-effectiveness analysis for those units based on a 10-year lifetime.

5. **SCAQMD must reevaluate their cost-effectiveness analysis to incorporate the significant operational and infrastructure energy costs that would be borne by facilities under Phase II and III. The SCAQMD cost-effectiveness calculations fail to include direct costs related to energy usage in the transition from natural gas fired ovens to electric ovens. Ramboll calculated a revised cost-effectiveness that incorporates the net increase in energy costs, which suggests that none of the categories is considered cost-effective when these costs are considered.**

   As discussed above, there are significant additional infrastructure and utility costs associated with replacement of existing units with electric ovens. Such costs should include electrical upgrades and

[14] US EPA Guidelines for Preparing Economic Analyses. Available at: https://www.epa.gov/environmental-economics/guidelines-preparing-economic-analyses.

[15] SCAQMD Preliminary Draft Staff Report. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1153-1/preliminary-draft-staff-report-par-1153-1---march-2023.pdf?sfvrsn=6.

[16] Ibid.

infrastructure at the facility, and electrical utility service upgrades directly related to the requirement for installation of electric equipment. The District must also include increased costs for electricity.

In order to understand how the increased cost of electricity would impact the cost-effectiveness analysis, Ramboll performed a high-level analysis using District cost effectiveness data and publicly available utility cost information using the following methodology:

1. Current SCAQMD-calculated Costs: Ramboll back-calculated the present worth value (PWV) for each PAR 1153.1 category based on the emission reductions and cost effectiveness presented in the Preliminary Draft Staff Report and Public Workshop presentation.
2. Ramboll-calculated power demand and corrected energy usage: Ramboll calculated the additional power demand required for electric oven replacements based on the estimated maximum power demand presented in WGM 7. Due to differences in equipment counts, WGM 7 power demand was scaled based on the equipment counts presented in the Public Workshop presentation relative to counts presented in WGM 7. In cases where an estimated power demand was not presented in WGM 7, Ramboll calculated the power demand based on the equipment ratings presented in WGM 6,[17] the number of units presented in the Public Workshop presentation, and the power demand formula presented in WGM 6, Slide 35. The total PAR 1153.1 power demand was then used to calculate an annual PAR 1153.1 energy usage assuming units operate 50% of the year.
3. Electricity Costs: The rule-wide electricity costs were calculated based on the corrected energy usage in combination with the California – Industrial electricity costs reported by the U.S. Energy Information Administration (EIA).[18]
4. Natural Gas Cost Savings: Cost savings (i.e., offsets) for eliminated natural gas usage were calculated based on the average natural gas costs from 2018–2022 as reported by Southern California Gas Company.[19] Estimated power demand was used to calculate the equivalent heat rating using the formula presented in WGM 6, Slide 35 and annualized assuming units operate 50% of the year.
5. Revised Cost-Effectiveness Calculation: Based on the additional costs related to the increased electricity usage and cost reductions associated with the elimination of natural gas, Ramboll added the additional operational costs using SCAQMD's discounted cash flow method. The revised cost-effectiveness was calculated based on the revised cost (including existing capital and O&M costs calculated by SCAQMD, electricity costs, and natural gas cost reductions), and the estimated emission reductions associated with the 0 ppm endpoint.

[17] The spray dryer category did not have a power rating presented in WGM 6. Thus, for the purposes of this calculation, Ramboll has assumed that a spray dryer unit operates at 3 MMBTU/hr to quantify energy demand costs.

[18] U.S. EIA 2021 Total Electric Industry- Average Retail Price (cents/kWh). Available at: https://www.eia.gov/electricity/sales_revenue_price/pdf/table4.pdf.

[19] SoCalGas Gas Procurement Prices Monthly Price. Available at: https://www.socalgas.com/for-your-business/energy-market-services/gas-prices.

Results of the analysis are presented in Table 1:

Table 1: Updated Cost-Effectiveness Considering Differences in Utility Costs.

PAR 1153.1 Category	Energy Costs (Electricity Costs – Natural Gas Costs) ($ PWV)	NOx Reductions (tpy)	Existing SCAQMD Capital & O&M Cost ($ PWV)	Revised Cost-Effectiveness ($/ton NOx removed)
Bakery Ovens	$720,000,000	49.3	$109,000,000	**$672,000**
Tortilla Ovens	$176,000,000	5.8	$13,100,000	**$1,290,000**
Cooking Ovens	$250,000,000	7.3	$6,940,000	**$1,410,000**
Drying Ovens	$93,900,000	3.3	$3,290,000	**$1,180,000**
Smokehouse Ovens	$51,500,000	4.0	$903,000	**$522,000**
Spray Dryers1	$221,000,000	2.2	N/A – No SCAQMD Cost-Effectiveness Presented	**$4,030,000**
Roasters	$452,000,000	4.4	$20,700,000	**$4,310,000**

[1] The revised cost-effectiveness presented for the spray dryer category is based solely on the estimated energy costs, as a SCAQMD cost-effectiveness was not reported for this category.

As shown in Table 1, **none of the categories are below the cost-effectiveness thresholds for Phase II/III** when utility usage costs are included in the calculation. Note that these results only include the cost differences for energy, and do not include infrastructure upgrade costs, such as upgrades to substations, transformers, meters, and switch gear, among other needed upgrades.

Infrastructure upgrades will be substantial. In a recent CARB workgroup meeting, the infrastructure cost for 10 MW of new capacity ranged from $300,000 (which assumes availability at the local substation) to $25 million for a new substation, transmission lines, and transformers.[20] Such costs for infrastructure upgrades would generally be borne directly by the facility and must be taken into account when estimating cost-effectiveness of the proposed technology.

SCAQMD must therefore reevaluate cost-effectiveness for these equipment categories to include the substantial additional energy and infrastructure costs.

6. Staff must ensure the decommissioning timelines include allowances to continue operating existing natural gas fueled equipment when permitted to use an alternative compliance schedule.

The electrification mandates in PAR 1153.1 will require significant upgrades both to the utility and facility electrical infrastructure. At a recent CARB meeting, a utility noted that anyone requesting projects over 2 MW would have an extended wait period of 5-7 years.[21] SCAQMD has included the option an Alternative Compliance Schedule Plan to address additional time that might be needed for a utility to provide the necessary energy to the facility to power the electric ovens. However, the rule is very prescriptive on when existing natural gas fueled ovens must be decommissioned based on unit and burner ages. The rule does not include provisions for situations where electrical

[20] CARB Transit Infrastructure Work Group Meeting, January 31, 2023. Available at: https://ww2.arb.ca.gov/sites/default/files/2023-02/transitinfrastructure_wkgmtg_1.31.23_full%20presentation.pdf..

[21] CARB Advanced Clean Fleets (ACF) Infrastructure and Zero-Emission Vehicle (ZEV) Availability Provisions. January 13, 2023.

infrastructure may not yet be available, but equipment has aged beyond the decommissioning compliance timelines.

In order to ensure that facilities can still operate within SCAQMD, Staff must ensure these decommissioning timelines include allowances to continue operating existing equipment when permitted to use an alternative compliance schedule.

7. **Ramboll recommends that all categories of equipment that have Table 1 limits be defined in Section (c) of the rule. PAR 1153.1 preliminary draft rule language contains Table 1 NOx and CO emission limits for cooking ovens; however, "Cooking Ovens" is not defined in the rule.**

8. **PAR 1153.1 preliminary draft rule language contains Table 1 NOx and CO emission limits for tortilla ovens. Ramboll believes that the numbers presented contain an error and requests that the rule language be updated to reflect the intent of the District for this category.**

   PAR 1153.1 preliminary draft rule language contains Table 1 NOx and CO emission limits for tortilla ovens as follows:

Equipment Categories		Phase I (ppmv)		Phase II (ppmv)		Phase III (ppmv)	
		NOx	CO	NOx	CO	NOx	CO
Tortilla Ovens	Heated Solely by IR Burners	30	800	N/A	N/A	0	0
	All Other Tortilla Ovens	15	800	N/A	N/A	0	0

   All PAR 1153.1 WGM presented Phase I proposed NOx emission limits for tortilla ovens heated solely by infrared (IR) burners and all other tortilla ovens of 15 ppmv and 30 ppmv respectively. Ramboll believes the numbers presented in Table 1 of the preliminary draft rule language to be in error and requests that the numbers be updated in the next version of draft rule language

9. **The PAR 1153.1 proposed rule language would require a facility complying with Phase III requirements to decommission a unit when the unit and burner reach a certain age, which could result in a requirement for a facility to replace equipment when the burners are less than 10 years of age. Ramboll's understanding from the District is that this is not the intent. Therefore, rule language should be updated as recommended below.**

   PAR 1153.1 Section (e) sets forth the compliance and decommissioning schedules for implementation of the three phases of NOx emission limits. For Phases I and II, SCAQMD proposes that facilities decommission each unit with an emission level that exceeds the applicable limits on or before July 1st that follows the end of the calendar year when the unit *or* burner reaches a certain age. This would allow a facility to operate a unit beyond a certain age if burners were recently replaced. However, for Phase III, SCAQMD is proposing that facilities decommission each unit with an emission level that exceeds the applicable limits on or before July 1st that follows the end of the calendar year when the unit *and* burner reach a certain age. This could result in a requirement for a facility to replace equipment when the burners are less than 10 years old. Our understanding from

discussion with SCAQMD is that this was an error in the rule language and not the intent of the District.[22] Ramboll recommends that rule language be updated as follows:

(e)(3)(C)(ii): For existing Units that will be replaced to meet Phase III Emission Limits, Decommission each Unit with an emission level that exceeds the Phase III Emission Limit pursuant to paragraph (d)(6):

(i) On or before July 1, 2030, if:

(A) The Unit is 25 years or older by January 1, 2030, as determined pursuant to paragraph (f)(2); and

(B) The burner is 10 years or older by January 1, 2030, as determined pursuant to paragraph (f)(1); and

(ii) On or before the July 1st that follows the end of the calendar year when:

(A) The Unit reaches 25 years of age, as determined pursuant to paragraph (f)(2); ~~or~~ and

(B) The burner reaches 10 years of age, as determined pursuant to paragraph (f)(1); and

Ramboll appreciates the opportunity to provide these comments related to PAR 1153.1. As outlined above, there are multiple items requiring further analysis and thorough discussion prior to rule adoption. The District and stakeholders need more time to ensure the necessary changes are incorporated into the rule. Ramboll recommends delay of the rule adoption until these items can be addressed.

We look forward to continued discussion of this important rulemaking. If you have questions regarding these comments, please contact me at (213) 943-6360 or via email at msweaver@ramboll.com.

Regards,

M. Scott Weaver, QEP
Principal & Practice Area Leader, Air and Climate Services

(213) 943-6360
msweaver@ramboll.com

SW:gw

[22] Personal communication between Y. Stutz, Ramboll, and S. Ka, SCAQMD, on April 4, 2023.