Comment Letter #72

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Via e-mail at: AQMPteam@aqmd.gov

Re: WSPA Comments on SCAQMD Draft 2022 Air Quality Management Plan

Dear Dr. Lee,

Western States Petroleum Association (WSPA) appreciates the opportunity to participate in the working group and workshops for the South Coast Air Quality Management District's (SCAQMD or District) 2022 Air Quality Management Plan (AQMP or Plan). The AQMP is a regional blueprint for achieving the national ambient air quality standards (NAAQS). On October 1, 2015, the U.S. Environmental Protection Agency (EPA) strengthened the National Ambient Air Quality Standards (NAAQS) for ground-level ozone, lowering the primary and secondary ozone standard levels to 70 parts per billion (ppb).[1] The 2022 AQMP is being developed to address the requirements for meeting this standard through proposed control measures.

WSPA is a non-profit trade association representing companies that explore for, produce, refine, transport, and market petroleum, petroleum products, natural gas, renewable fuels, and other energy supplies in five western states including California. WSPA has been an active participant in air quality planning issues for over 30 years. WSPA-member companies operate petroleum refineries and other facilities in the South Coast Air Basin that are regulated by the SCAQMD and will be impacted by the 2022 AQMP.

We understand the challenges that the District faces in attaining the NAAQS. The region's unique topography and meteorology combined with mobile source emissions continues to produce significant ozone pollution for which the District has limited control authority. And as cost-effective controls have been implemented, it has become increasingly difficult to identify and implement additional control measures that are cost-effective. On May 6, 2022, SCAQMD released the Draft 2022 AQMP, with additional appendices released on June 1, 2022.[2] WSPA offers the following comments.

[1] 2015 Revision to 2008 Ozone NAAQS. Available at: https://www.federalregister.gov/documents/2015/10/26/2015-26594/national-ambient-air-quality-standards-for-ozone.
[2] SCAQMD Draft 2022 AQMP. Available at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/draft2022aqmp.pdf?sfvrsn=12.

1. **SCAQMD has proposed a control measure L-CMB-07 to reduce NOx emissions from petroleum refineries by 0.77 tons per day, or 20% below post Rule 1109.1 implementation levels. The petroleum refining industry will be working to meet the requirements of the recently adopted Rule 1109.1 for the next decade. L-CMB-07 describes several technologies that were recently demonstrated by the District as infeasible, unproven, or not to be cost effective. Furthermore, the timetable for the proposed measure would overlap with the Rule 1109.1 compliance schedule. Given these facts, SCAQMD should reconsider the inclusion of proposed control measure L-CMB-07.**

   SCAQMD Rule 1109.1, Emissions of Oxides of Nitrogen from Petroleum Refineries and Related Operations, was developed as a result of the 2016 AQMP control measure CMB-05, which required a transition from RECLAIM to a command and control regulatory structure requiring Best Available Retrofit Control Technology (BARCT) level controls as soon as practicable.[3,4] That rule, adopted in November 2021, will reduce NOx emissions from refinery boilers, process heaters, fluid catalytic cracking units, gas turbines, and other equipment, and is one of the most complex and costly rules ever adopted by the SCAQMD. Costs of implementation for the rule are expected to range from $2.3 billion to $2.9 billion and will result in 7.7 – 7.9 tons per day (tpd) NOx reductions. This would involve installation of approximately 70 new selective catalytic reduction (SCR) systems, upgrades to about 30 existing SCR systems, and other equipment modifications.[5]

   Due to the complexity of the equipment installations and the number of units that must be modified because of the rule, the District's compliance schedule provides flexibility such that the last permit applications are not due until January 1, 2031, with compliance required no later than 36 months after Permit to Construct (PTC) issuance. Depending on permit application processing time, final compliance with Rule 1109.1 requirements for some equipment could be as late as 2034-2036.

   The 2022 AQMP states that the remaining emission inventory for petroleum refineries after implementation of Rule 1109.1 requirements will be 3.82 tpd. SCAQMD has proposed control measure L-CMB-07 to reduce NOx emissions from petroleum refineries by an additional 20% (0.77 tpd) by 2037 through further control of large boilers and process heaters (i.e., rated at 40 million BTU/hr or larger). Rule 1109.1 already requires this equipment to meet a NOx emission limit of 5 ppm. SCAQMD now suggests that further emission reductions can be achieved through the use of next generation ultra-low NOx burner (ULNB), advanced SCR design, and zero emission technologies. SCAQMD is proposing rule development to be initiated between 2025 and 2027 to achieve emission reductions by 2037.

   The District has suggested that next generation ULNB products can alleviate some of the challenges of conventional ULNB such as safety concerns associated with retrofit applications. At Proposed Rule 1109.1 (PR1109.1) Working Group Meeting (WGM) #17, one vendor provided a presentation on development of their core process burner. The presentation cited < 7 ppm NOx emissions for a limited number of projects involving

[3] SCAQMD Rule 1109.1. Available at: https://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1109-1.pdf?sfvrsn=8.
[4] SCAQMD 2016 AQMP. Available at: http://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.
[5] SCAQMD Rule 1109.1 Governing Board Package, November 5, 2021, Agenda No. 34. Available at: http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2021/2021-Nov5-034.pdf?sfvrsn=6.

equipment rated at 39 MMBtu/hr or less.[6] However, it was unclear if any of the projects were able to demonstrate the lower emission rate when burning refinery fuel gas, or whether any of the projects involved equipment rated at ≥40 MMBtu/hr input, as suggested in the proposed L-CMB-07 measure. SCAQMD provided information on a different burner technology at PR1109.1 WGM #12, noting that the burner system requires heat releases between 1 and 20 MMBtu/hr, and has been demonstrated to achieve approximately 5 ppm NOx using natural gas at a test facility. That vendor noted that refinery fuel gas may result in higher emissions.[7] Due to the expectation of higher emissions when burning refinery fuel gas, SCAQMD evaluated the cost-effectiveness of a 9 ppm BARCT endpoint for NOx for equipment burning refinery fuel gas.

There are several design criteria necessary for safe and effective operation of ULNB in refinery heaters. For example, due to higher flame lengths generated by ULNB, the radiant section of the heater fire box needs to be long enough to avoid flame impingement on internal surfaces (i.e., a significant safety concern). Additionally, to take advantage of internal flue gas recirculation (IFGR) patterns to lower NOx, both burner-to-burner spacing and the spacing between burners and heater internals must be appropriate to avoid flame impingement. Refinery heaters and boilers have fixed radiant section geometries, tube configurations, and other internal surfaces that in many cases limit the unit's ability to accommodate additional spacing demands needed for newer ULNB products. Flame impingement can cause tube rupture of radiant tubes which contain flammable material, resulting in a potentially catastrophic explosion event, making it impossible to safely retrofit ULNB in many existing refinery heaters and boilers. Options to avoid flame impingement would include significant rebuild of the unit's geometry (if feasible), or complete replacement of the refinery heater or boiler.

For L-CMB-07, WSPA understands that SCAQMD is suggesting a new 2 ppm endpoint through an additional requirement to add these emerging technologies. However, SCAQMD has provided no technical basis to support the claim that this will be achievable for refinery boilers and process heaters rated at ≥40 MMBtu/hr input using refinery fuel gas. The PR1109.1 Final Staff Report identified one example of next generation ULNB installed on a 39 MMBtu/hr vertical cylindrical heater at a refinery which was reportedly demonstrated with NOx levels at 29.3 ppmv.[8] Further, it has not been explained how any of the concerns raised in the PR1109.1 proceedings will be overcome. Those concerns include process safety and technical feasibility issues such as flame impingement and boiler geometry. Given these retrofit uncertainties, cost-effectiveness is likely to be a challenge.

SCAQMD has referenced recent SCR installations use of advanced feedback controls to modulate ammonia injection to reduce ammonia consumption and minimize ammonia emissions while maintaining high NOx removal efficiencies. They do not propose that these feedback controls actually increase NOx removal efficiencies. Instead, they suggest that there are existing SCR installations utilizing a dual stage reactor design to maximize NOx reductions, noting that removal efficiencies of up to 99% are possible with this design. The District has not provided any information to suggest that such technology can be retrofit to

[6] SCAQMD Proposed Rule 1109.1 WGM #17. ClearSign Technologies Presentation. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1109.1/clearsign-update-for-scaqmd---pr-1109-1.pdf?sfvrsn=6.
[7] SCAQMD PR1109.1 WGM #9 Presentation. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1109.1/pr1109-1-wgm_9_final.pdf?sfvrsn=12.
[8] SCAQMD PR1109.1 Final Staff Report, page A-9. Available at: http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2021/2021-Nov5-034.pdf?sfvrsn=6.

existing SCR systems – systems which are presently being retrofit to comply with existing R1109.1.

WSPA notes that SCAQMD exhaustively evaluated the option of dual SCR designs during the development of PR1109.1. SCAQMD contracted two third-party engineering consultants to review the staff's preliminary BARCT assessment. The assignments for each consultant were defined as follows:[9]

- Norton Engineering Consultants (NEC):
  - Perform a BARCT feasibility assessment which includes commercially viable NO_x control technologies and emission reduction levels that each technology can achieve and any caveats associated with achieving NOx reductions; and
  - Review and verify cost analysis including the use of the U.S. Environmental Protection Agency (EPA) SCR Cost Model, model input assumptions, local labor costs, and other factors that affect the cost-effectiveness evaluation.
- Fossil Energy Research Corporation (FERCo):
  - Conduct facility visits to make detailed on-site observations and engineering evaluations of affected equipment;
  - Review the feasibility of installation, including feasibility of installation of new control technologies;
  - Consider challenges associated with installation of control technologies such as space constraints, and burner technology; and
  - Determine if further optimization can be performed on currently installed NO_x control systems to help achieve further emission reductions.

In PR1109.1 WGM #17, the District stated that "Staff consulted with NEC, FERCo , and SCR catalyst vendors regarding the feasibility of installing ULNB and achieving 2 ppmv NOx for units with sub optimal conditions" and the "consultants stated that regardless of ULNB NOx performance, the proposed 2 ppm endpoint is feasible by installing multiple catalyst reactors or a two stage SCR."[10] NEC's expert opinion was that the proposed BARCT endpoint would require secondary ammonia injection grids (AIG) for downstream SCR catalyst bed(s).[11] This design effectively requires two SCR systems in series.

The November 2020 FERCo report stated that the physical spaces around the refinery heater units are typically very congested, significantly limiting the distance available between the AIG and the SCR catalyst.[12] That report noted that achieving the high level of NOx removal necessary requires exceptionally good mixing of ammonia into the flue gas stream ahead of the catalyst, which could require two reactors.[13] While FERCo offered some ideas concerning the location of one AIG relative to the SCR catalyst grid, FERCo did not consider more complicated spatial requirements for accommodating multiple AIG. SCAQMD did acknowledge this obstacle in L-CMB-07, stating "a case-by-case evaluation

[9] Execute Contracts for Engineering Consultant to Review the BARCT Assessment for Proposed Rule 1109.1 – NOx Emission Reductions for Refinery Equipment. SCAQMD Governing Board Meeting. May 3, 2019. Available at: http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2019/2019-may3-005.pdf?sfvrsn=2.
[10] PR1109.1 WGM #17 presentation. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1109.1/pr1109-1_wgm17_020421.pdf?sfvrsn=6.
[11] Norton Engineering Proposed Rule 1109.1 NOx BARCT Review. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1109.1/norton-report.pdf?sfvrsn=6.
[12] FERCo South Coast Air Quality Management District Rule 1109.1 Study Final Report (FERCo Report), page 5-3, November 2020. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1109.1/ferco-report.pdf?sfvrsn=6.
[13] FERCo Report (page 5-3).

will be needed to assess the feasibility due to the additional footprint requirements associated with a dual stage SCR arrangement."[14]

The final control method suggested in L-CMB-07 is zero emission technologies, including electrification of steam driven equipment and replacement of gas fired boilers and process heaters with electric boilers and process heaters. WSPA is not aware that such zero emission technology has been demonstrated for these types of refinery equipment. Additionally, SCAQMD correctly notes in their evaluation of this option that "this alternative needs to consider electrical infrastructure and potential impacts on refinery fuel gas balance, as there may be an excess of waste refinery fuel gas if combustion equipment is replaced with electrified versions." WSPA agrees that broad replacement of fuel fired equipment with electric equipment would require careful consideration of capacity and infrastructure availability. Please see Comment #4.

The petroleum refining industry is in the process of designing and installing equipment to meet the requirements of Rule 1109.1 at a District-estimated capital investment cost of $180 million to $1 billion per refinery, with final compliance dates stretching out to as late as 2036.[15] Industry estimates of implementation costs were considerably higher.[16] Emission reductions attributed to the petroleum refining industry in the District's proposed L-CMB-07 would depend entirely on emerging ULNB technology that is not demonstrated. Additionally, the District is proposing potential unquantified emission reductions from dual SCR installations when they are aware that there are significant technical feasibility problems. Considering the Rule 1109.1 implementation timeline, capital cost investment, and reliance on unproven technology, SCAQMD should reconsider the inclusion of proposed control measure L-CMB-07 in this Draft AQMP.

2. **The District provides estimated reductions from each proposed stationary source control measure in Table 4-2 of the 2022 AQMP. Where the District has not provided any technical feasibility or cost-effectiveness support, values should be moved to the District's Clean Air Act (CAA) Section 182(e)(5) estimate.**

Clean Air Act (CAA) Section 182(e)(5) allows the Administrator to "approve provisions of an implementation plan for an Extreme Area which anticipate development of new control techniques or improvement of existing control technologies…."[17] Extreme nonattainment areas with approved Section 182(e)(5) commitments only need to submit attainment contingency measures three years prior to the attainment date.[18] The 2022 Draft AQMP measures include Section 182(e)(5) NOx reductions of 3 tpd for stationary sources.[19]

The District provides estimated reductions from each proposed stationary source control measure in Table 4-2 of the 2022 AQMP. However, many of these reductions are based on concepts where the District has not demonstrated technical feasibility or cost-effectiveness.

[14] SCAQMD Draft 2022 AQMP, Appendix IV-A. Available at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/appiv-a.pdf?sfvrsn=18.
[15] SCAQMD Rule 1109.1 Governing Board Package, November 5, 2021, Agenda No. 34. Available at: http://www.aqmd.gov/docs/default-source/Agendas/Governing_Board/2021/2021_Nov5_034.pdf?sfvrsn=6.
[16] WSPA Proposed Rule 1109.1 Comment Letter, February 16, 2021. Available at: http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1109.1/wspa-pr1109-1-bh-comment-letter-02162021.pdf?sfvrsn=8.
[17] Clean Air Act Title I Part D, Plan Requirements for Nonattainment Areas, §182, Plan Submissions and Requirements. Available at: https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partD-subpart2-sec7511a.htm.
[18] Clean Air Act Title I Part D, Plan Requirements for Nonattainment Areas, §182, Plan Submissions and Requirements. Available at: https://www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partD-subpart2-sec7511a.htm.
[19] SCAQMD Draft 2022 AQMP. Available at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/draft2022aqmp.pdf?sfvrsn=12

California Health and Safety Code §40920.6 requires districts to assess the cost-effectiveness of a potential control option prior to adopting rules or regulations to meet the requirement for best available retrofit control technology.[20] SCAQMD has proposed a cost-effectiveness threshold of $59,000/ton NOx reduced for stationary sources, but notes in the 2022 Draft AQMP that this value will be adjusted to the dollar year used for socioeconomic modeling in each subsequent rulemaking in order to account for annual inflation.

Table 1 provides the stationary source control measures, estimated emission reductions, and associated cost-effectiveness for NOx reduction.

Table 1: 2022 AQMP Stationary Source Control Measures

Measure	Control Measure Name	2037 NOx Reductions	Cost-Effectiveness
R-CMB-01	Emission Reductions from Replacement with Zero Emission or Low NOx Appliances - Residential Water Heating [NOx]	1.29	$0 - $230,000
R-CMB-02	Emission Reductions from Replacement with Zero Emission or Low NOx Appliances - Residential Space Heating [NOx]	1.2	$0 - $200,000
R-CMB-03	Emissions Reductions from Residential Cooking Devices [NOx]	0.81	Cost Savings
R-CMB-04	Emission Reductions from Replacement with Zero Emission or Low NOx Appliances - Residential Other Combustion Sources [NOx]	3.13	TBD
C-CMB-01	Emission Reductions from Replacement with Zero Emission or Low NOx Appliances - Commercial Water Heating [NOx]	0.25	$0 - $105,000
C-CMB-02	Emission Reductions from Replacement with Zero Emission or Low NOx Appliances - Commercial Space Heating [NOx]	0.21	$0 - $56,000
C-CMB-03	Emission Reductions from Commercial Cooking Devices [NOx]	0.62	$0 - $290,000
C-CMB-04	Emission Reductions from Small Internal Combustion Engines [NOx]	2.1	TBD
C-CMB-05	NOx Reductions from Small Miscellaneous Commercial Combustion Equipment (Non-Permitted) [NOx]	4.24	$196,000
L-CMB-01	NOx Reductions from RECLAIM Facilities [NOx]	0.28	$11,900
L CMB 02	Reductions from Boilers and Process Heaters (Permitted) [NOx]	0.5	$19,000 $88,000
L-CMB-03	NOx Emission Reductions from Permitted Non-Emergency Internal Combustion Engines [NOx]	0.31	TBD
L-CMB-04	Emission Reductions from Emergency Standby Engines (Permitted) [NOx, VOCs]	2	TBD

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

L-CMB-05	NOx Emission Reductions from Large Turbines [NOx] .	0.06	$368,000
L-CMB-06	NOx Emission Reductions from Electricity Generating Facilities [NOx]	0.62	$722,000
L-CMB-07	Emission Reductions from Petroleum Refineries [NOx]	0.77	$50,300
L-CMB-08	NOx Emission Reductions from Combustion Equipment at Landfills and Publicly Owned Treatment Works [NOx]	0.33	$20,000
L-CMB-09	NOx Reductions from Incinerators [NOx]	0.89	$2,500
L-CMB-10	NOx Reductions from Miscellaneous Permitted Equipment [NOx]	1.16	$5,600 - $49,000

As shown in Table 1, eight control measures either exceed or potentially exceed the proposed cost-effectiveness threshold of $59,000 per ton of NOx reduced. These eight control measures are estimated by staff to provide 8.78 tpd NOx reductions. An additional four control measures, with estimated NOx reductions of 7.54 tpd, have cost-effectiveness that is yet to be estimated. Additionally, as discussed in Comment #1, there are potential refinery equipment redesign or replacement costs that could increase the cost-effectiveness for proposed L-CMB-07.

Additionally, SCAQMD has noted that technical feasibility for some control measures is unknown. SCAQMD estimates approximately 1.6 tpd NOx reduction by 2037 from control measure L-CMB-10 utilizing ULNB and LNB based on next generation ULNB such as ClearSign™ and Solex™. However, staff goes on to note that "these burner technologies are also being installed at heavy industrial processes such as refinery operations which are generally larger than the equipment currently regulated under Rule 1147. *It is unknown at this time whether the technologies can be scaled to smaller processes seen in Rule 1147.*"[21] [Emphasis added]. In fact, those same technologies have also not yet been commercialized in the larger scale equipment.

For those control measures that have yet to have cost-effectiveness determined, exceed the cost-effectiveness threshold, or have not been estimated on the potential to be technically feasible, SCAQMD should move the estimated emission reductions to the Section 182(e)(5) measures.

[21] SCAQMD 2022 AQMP, Appendix IV-A. Available at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/appiv-a.pdf?sfvrsn=18.

3. SCAQMD uses the California Air Resources Board (CARB) EMission FACtor 2017 (EMFAC2017) model to calculate the on-road motor vehicle emission estimates used in the 2022 AQMP. This model is outdated and does not consider emission reductions from recently adopted regulations. Baseline and future year emission estimates should be based on the 2021 version of the model.

The 2022 AQMP calculates on-road motor vehicle emissions using CARB's EMFAC2017 model and travel activity data provided by the Southern California Association of Governments (SCAG). The EMFAC model calculates exhaust and evaporative emission rates by vehicle type for different vehicle speeds and environmental conditions.[22]

CARB released EMFAC2021 on January 15, 2021. The updated version of the model reflects CARB's understanding of statewide and regional vehicle activities, emissions, and recently adopted regulations. The updated model includes new features such as:[23]

- Expansion of fuel technologies to include plug-in hybrid electric vehicles and natural gas-powered vehicles
- Expansion of heavy-duty truck categories to provide higher resolution on weight classes
- Updated approach to light-duty activity forecasting using economic indicators to optimize the performance in predicting historical data
- A new heavy-duty vehicle miles traveled (VMT) forecasting framework. EMFAC 2017 projected diesel heavy duty VMT at a statewide level, while EMFAC 2021 forecasts VMT by county.
- A light-duty zero emission vehicle (ZEV) forecasting framework. EMFAC 2017 projected ZEV market share based on the most likely compliance scenario with California's ZEV mandate, whereas EMFAC2021 California Energy Commission (CEC) vehicle choice models coupled with CARB's updated ZEV input attributes.

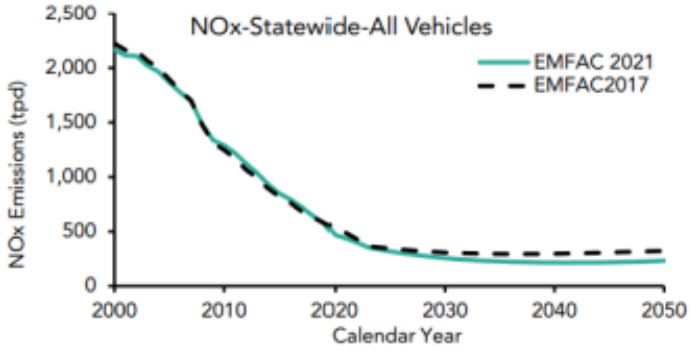
In addition to the new features, major changes to were made to:

- Fleet characterization using the most recent Department of Motor Vehicle (DMV) registration data
- In-use emissions for light-duty and heavy-duty vehicles
- Updates to operational characteristics influencing vehicle emissions, including mileage accrual rates, starts per day, and temporal distribution of VMT and trips.
- New sales and VMT forecasting
- Include updated policies and regulations such as:
  - Innovative Clean Transit (ICT), which requires public transit agencies to transition to a 100% ZE bus fleet.[24]
  - Advanced Clean Truck (ACT), which requires a certain percentage of zero emission truck sales to be sold on an annual basis.[25]
  - Heavy-Duty Omnibus, which ensures that heavy-duty engines will emit much lower NOx emissions throughout their lifetimes.[26]

[22] CARB EMFAC Model. Available at: https://arb.ca.gov/emfac/.
[23] CARB EMFAC2021 Volume III Technical Document. Available at: https://ww2.arb.ca.gov/sites/default/files/2021-08/emfac2021_technical_documentation_april2021.pdf.
[24] CARB Innovative Clean Transit Regulation. Available at: https://ww2.arb.ca.gov/our-work/programs/innovative-clean-transit
[25] CARB Advanced Clean Trucks Regulation. Available at: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks.
[26] CARB Heavy-Duty Engine and Vehicle Omnibus Regulation. Available at: https://ww2.arb.ca.gov/rulemaking/2020/hdomnibuslownox.

EMFAC2017 does not address changes in emissions as a result of recently adopted vehicle regulations. These regulations will drastically change the emissions profile of on-road vehicle emissions in the coming years. As shown in Figure 1, EMFAC 2017 was shown by CARB to overstate projected NOx emissions when compared with EMFAC2021.[27]

Figure 1. Comparison of NOx emission estimates between EMFAC2017 & EMFAC2021



WSPA understands that SCAQMD used EMFAC2017 because it has been approved by EPA for SIP and conformity purposes. However, relying on the outdated model for this AQMP will result in an overstatement of on-road emissions in baseline emissions inventory. WSPA encourages SCAQMD to evaluate the differences between the two models and include a certain percentage of the NOx emissions resulting from the use of EMFAC2017 in the Section 182(e)(5) emissions estimate.

4. **The 2022 Draft AQMP includes a number of control measures which would force electrification of different types of equipment. Before advancing such measures, SCAQMD must consider the potential grid reliability impacts, costs impacts, and demands for electricity infrastructure that such control measures would place on California's already strained electric grid infrastructure.**

The District has stated that the only viable solution to achieving the NAAQS for ozone requires a significant push to zero emission technology.[28] California faces unresolved grid reliability issues that will be exacerbated by the proposed AQMP control measures and the resulting electricity demand increases. SCAQMD has not considered the generation, transmission, or distribution constraints of the electric grid in its proposals.

Californians have already been experiencing an increasing number of electricity outages. In response to an August 2020 heatwave that caused nearly half a million Californians to lose power, the California Independent System Operator (CAISO), California Public Utilities Commission (CPUC), and the California Energy Commission (CEC) jointly prepared a

[27] CARB EMFAC2021 Volume III Technical Document. Available at: https://ww2.arb.ca.gov/sites/default/files/2021-03/emfac2021_volume_3_technical_document.pdf.
[28] SCAQMD 2022 AQMP Control Measures Workshop, Agenda Item 3. Available at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/am-pres-agenda-item-3-zero-emission-technology-110621.pdf?sfvrsn=6.

Preliminary Root Cause Analysis of the outages.[29] The report identified several factors that contributed to the rotating outages:

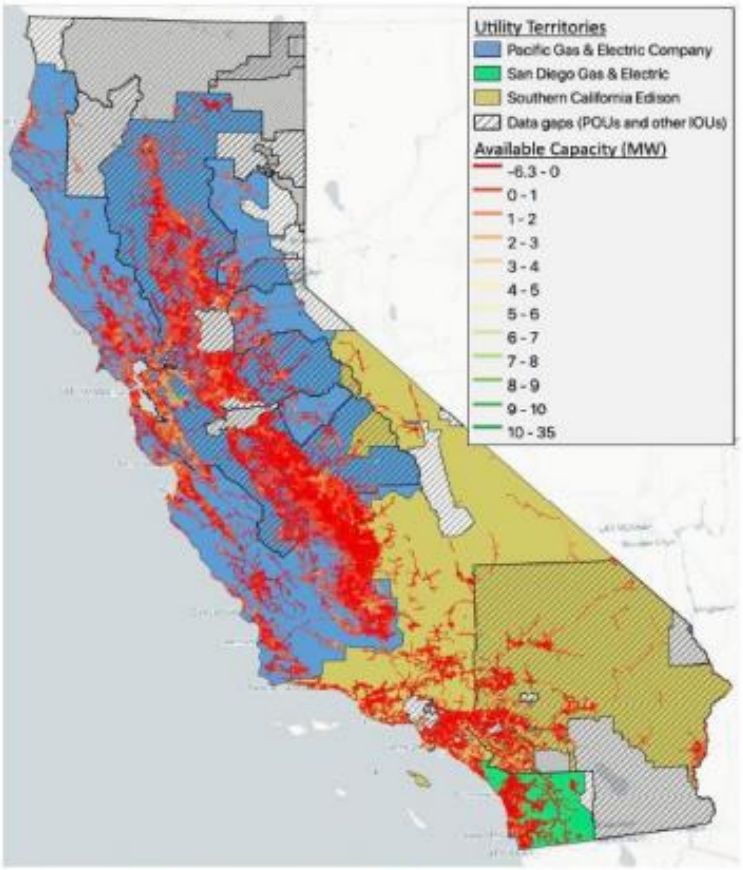
- The climate change-induced extreme heat storm across the western United States resulted in the demand for electricity exceeding the existing electricity resource planning targets. The existing resource planning processes are not designed to fully address an extreme heat storm like the one experienced in mid-August.
- In transitioning to a reliable, clean, and affordable resource mix, resource planning targets have not kept pace to lead to sufficient resources that can be relied upon to meet demand in the early evening hours. This makes balancing demand and supply more challenging. These challenges were amplified by the extreme heat storm.
- Some practices in the day-ahead energy market exacerbated the supply challenges under highly stressed conditions.

Governor Gavin Newsom issued a Proclamation of a State of Emergency in 2021, noting that there is a shortfall of up to 5,000 megawatts projected for the summer of 2022 given the likelihood that trends of drought, wildfire, and heatwaves continue.[30] The proclamation ordered that all energy agencies act immediately to achieve energy stability, including accelerated plans for construction, procurement, and deployment of new clean energy and storage projects to mitigate the risk of capacity shortages.

Generation capacity is only one aspect of the strains on the electric grid. Both transmission and distribution must also be considered. The CEC recently reviewed constraints associated with electricity transmission and distribution. The CEC's Electric Vehicle Supply Equipment Deployment and Grid Evaluation (EDGE) tool compares load contributions from the CEC infrastructure model results to the capacities of existing distribution grids in the state to host new electricity loads.[31] The EDGE model flags locations needing an infrastructure upgrade if there is a capacity deficiency. Figure 2 shows that the California grid has no additional capacity to add electrical load on most circuits.[32] 30% to 76% of circuit segments have no capacity to integrate additional load.[33] Thus no appreciable load can be added to most of these circuits without additional construction of transmission and distribution infrastructure.

[29] CAISO, CPUC, CEC Preliminary Root Cause Analysis, Mid August 2020 Heat Storm. Available at: http://www.caiso.com/Documents/Preliminary-Root-Cause-Analysis-Rotating-Outages-August-2020.pdf.
[30] State of California Proclamation of A State of Emergency, July 30, 2021. Available at: https://www.gov.ca.gov/wp-content/uploads/2021/07/Energy-Emergency-Proc-7-30-21.pdf.
[31] CARB Advanced Clean Cars II Draft Environmental Analysis. Available at: https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/accii/appe1.pdf.
[32] CARB Advanced Clean Cars II Draft Environmental Analysis. Available at: https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/accii/appe1.pdf.
[33] Virtual Medium and Heavy-Duty Infrastructure Workgroup Meeting - 01/12/22. Available at: https://www.youtube.com/watch?v=_mr0TmwxGZQ.

Figure 2. Capacity Analysis from CEC's EDGE Tool (note: dark red indicates no available additional capacity).



SCAQMD notes that the preliminary estimates of statewide ZE infrastructure needs developed by the CEC and CARB "are largely based on a transition to ZE vehicles for on-road transportation sources, and do not fully address the adoption of ZE technologies by other emission sources, including stationary, locomotives, and off-road equipment."[34] SCAQMD has proposed strategies to advance deployment of ZE technologies, including researching the specific needs of the South Coast Air Basin (SCAB), and supporting existing work by other agencies.

SCAQMD and CARB must ensure that electric grid capacity, transmission, and distribution is available to support the number of equipment required by the proposed measures which would depend on broad electrification. For this AQMP, SCAQMD must consider the cost of required grid infrastructure upgrades in their cost-effectiveness and socioeconomic analyses.

[34] SCAQMD 2022 AQMP Policy Brief, Infrastructure – Energy Outlook. Available at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/combined-infrastructure---energy-outlook.pdf?sfvrsn=8

5. **The 2022 State SIP Strategy is insufficient to attain the 70-ppb federal 8-hour ozone standard by 2037. In fact, CARB's singular focus on zero emission vehicles has undermined the commitments that CARB made in the 2016 Mobile Source Strategy, which would have resulted in greater and faster NOx emission reductions through the use of low-emitting internal combustion engine technologies and fuels.**

   SCAQMD projects that emissions of NOx must be reduced by 71% beyond what would be achieved through current regulations by 2037 in order to meet the federal 8-hour ozone standard. Mobile sources, regulated by CARB, are responsible for over 80% of NOx emissions in the SCAB. CARB is required by law to adopt rules, regulations, and other measures that, in conjunction with district and US EPA measures, will achieve federal ambient air quality standards by the applicable attainment date.[35] CARB's Mobile Source Strategy and State Mobile Source SIP Strategy are key elements for meeting the ozone attainment standards in the SCAB.

   CARB released a draft version of the 2022 State Strategy for the State Implementation Plan (SIP) on January 31, 2022.[36] Throughout the development and discussion of the Draft 2022 State SIP Strategy, stakeholders have expressed repeated concern that CARB's proposed pathway fails to provide the emission reductions necessary to achieve key attainment targets in the state. The Draft 2022 State SIP Strategy does not appear to be sufficient to attain the 70-ppb federal 8-hour ozone standard by 2037 in the SCAB. CARB acknowledges that there is a 47 tpd emission reduction shortfall necessary for attainment in the SCAB.[37] However, CARB's strategy is focused almost entirely on ZEV deployment, relying upon uncertain vehicle and infrastructure availability, with a timeline spanning to 2045 and emission benefits realized only in later years. CARB is ignoring potential near-term emission reductions by refusing to discuss broader use of lower-emitting internal combustion engine technologies, which results in delayed attainment in the SCAB.

   Additionally, the State SIP Strategy and this 2022 Draft AQMP completely disregard the state's federal Clean Air Act obligations to attain the 1979 1-hr ozone NAAQS (120-ppb, 2023 deadline, currently exceeded by 39%), 1997 8-hour ozone NAAQS (80-ppb, 2024 deadline, currently exceeded by 43%), and 2008 8-hour ozone NAAQS (75-ppb, 2032 deadline, currently exceeded by 52%).[38] The District should revise the 2022 AQMP to remedy this deficiency.

6. **The District has proposed control measures addressing both VOC and NOx reductions. However, the District's attainment strategy has demonstrated no need for the VOC control measures. These measures should be removed from the AQMP.**

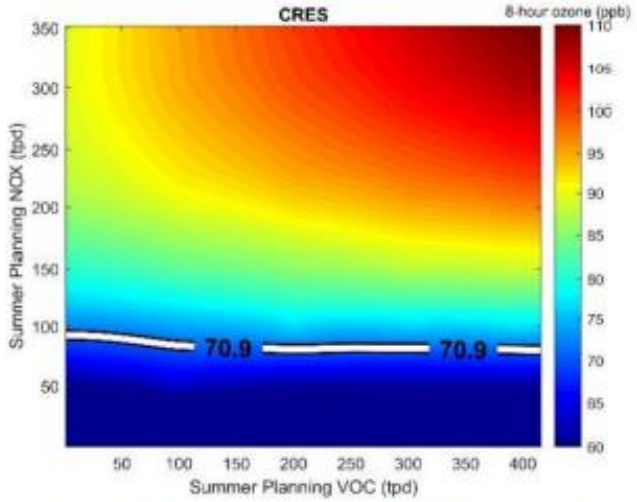
   The District has asserted that to meet the 2015 ozone standard, NOx emissions must be reduced by 157 tons per day. SCAQMD performed modeling of future ozone concentrations using the Community Multiscale Air Quality (CMAQ) model to model emissions in 2018, 2037 baseline emissions, and 2037 control case which contains additional emission reductions proposed in the 2022 AQMP. SCAQMD conducted a series of ozone simulations with varying NOx and VOC emissions to estimate the quantity of reductions needed to meet

[35] California Health and Safety Code §39602.5. Available at: https://codes.findlaw.com/ca/health-and-safety-code/hsc-sect-39602-5.html.
[36] CARB Draft 2022 State Strategy for State Implementation Plan, January 31, 2022. Available at: https://ww2.arb.ca.gov/sites/default/files/2022-01/Draft_2022_State_SIP_Strategy.pdf.
[37] CARB Draft 2022 State Strategy for State Implementation Plan, January 31, 2022. Available at: https://ww2.arb.ca.gov/sites/default/files/2022-01/Draft_2022_State_SIP_Strategy.pdf.
[38] SCAQMD 2022 AQMP, Chapter 5. Available at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/appiv-a.pdf?sfvrsn=18

the NAAQS. Isopleths were created to approximate the expected ozone design value for given levels of VOC and NOx emissions.

Figure 3 shows the District's isopleth for Crestline where NOx and VOC emissions correspond to basin wide emissions totals. Under this model, the Crestline area would achieve attainment when the design value is less than or equal to 70.9 ppb, denoted by the white line.[39]

Figure 3. Isopleth for Crestline Depicting Basin Total NOx and VOC Emissions and Corresponding Ozone Design Value



In describing the results of this isopleth analysis, the District stated:[40]

> "With VOC emissions greater than 300 tons per day, the corresponding NOx emissions along the white contour are approximately 60-70 tons per day at GLEN and 70-80 tons per day at CRES. The isopleth further demonstrates that VOC reductions alone are insufficient to demonstrate attainment; **NOx reductions are the only pathway to attainment.**" [emphasis added]

Despite this NOx only attainment strategy, the District has included several control measures to reduce VOC emissions in the basin. However, they have provided no foundation for why these VOC reductions are necessary to meet the ozone standards. Given that the isopleths do not support the need for additional VOC reductions, SCAQMD should provide additional documentation demonstrating the reasoning behind their decision to propose VOC control measures.

[39] SCAQMD Draft 2022 AQMP, Appendix V. Available at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/combined-appendix-v.pdf?sfvrsn=8.
[40] SCAQMD Draft 2022 AQMP, Appendix V. Available at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/combined-appendix-v.pdf?sfvrsn=8.

WSPA appreciates the opportunity to provide these comments related to the 2022 AQMP. We look forward to continued discussion of this important Plan development. If you have any questions, please contact me at (310) 808-2146 or via e-mail at rcromartie@wspa.org.

Sincerely,

Cc:

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