

April 22, 2024

Ms. Sang-Mi Lee
Planning and Rules Manager
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4178

BURBANK-GLENDALE-PASADENA AIRPORT AUTHORITY SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT MEMORANDUM OF UNDERSTANDING (MOU) – REVISED ANNUAL PROGRESS REPORT FOR CALENDAR YEARS 2022

Dear Ms. Lee,

Burbank-Glendale-Pasadena Airport Authority (“Authority”) is pleased to submit the Authority’s revised annual progress report as requested by the South Coast Air Quality Management District (“South Coast AQMD”). On December 17, 2019, a Memorandum of Understanding (“MOU”) was entered into between the South Coast AQMD and the Authority. This report details the progress achieved in Calendar Year (“CY”) 2022 and is intended to provide an overview of the Authority’s efforts to implement the MOU measures and quantify actual emission reductions. There are two MOU measures in the Authority’s MOU related to non-aircraft commercial passenger airport mobile sources – the Ground Support Equipment Program and the Hollywood Burbank Airport Shuttle Fleet Conversion. Information requested by South Coast AQMD on each of these measures and their associated equipment and emissions are provided in the following sections. This report does not apply to any source or operation of any source that is not specifically identified in the MOU measures.

On August 17, 2023, South Coast AQMD completed a preliminary review of the CY 2022 GSE inventory, which the Authority submitted on June 1, 2023, and provided comments. Several of the provided comments were applicable to only the CY 2022 inventory, while other comments were also applicable to the CY 2021 inventory, which had been most recently revised and resubmitted on February 8, 2023. The Authority provided responses to South Coast AQMD’s comments on September 14, 2023, and provided additional clarification on October 4, 2023. On October 25, 2023, South Coast AQMD completed a final review of the CY 2022 GSE inventory and provided final comments. On November 3, 2023, the Authority provided final responses to South Coast AQMD’s final comments, and this revised annual progress report incorporates all applicable revisions to the CY 2022 and CY 2021 inventories based on those final and all preceding comments, including: adjustments to deterioration rate calculations for low use equipment and revisions to the operating specifications of several specific GSE. Updated CY 2022 and CY 2021 inventories are provided to South Coast AQMD as part of this final revised annual progress report. No comments warranted revision to the June 2023 annual progress report data related to the zero-emission shuttle measure of the MOU.

The emergence of the COVID-19 pandemic in early 2020 significantly disrupted air travel for most of CY 2020, with passenger counts recovering throughout 2021 and generally returning to 2019 levels in 2022.

In 2022, approximately 5.9 million passengers traveled through Hollywood Burbank Airport (“Airport”), representing a 58 percent increase relative to 2021 and only a 1 percent decrease relative to 2019, indicating that passenger air travel levels have effectively recovered to pre-pandemic levels. However, this recovery is tempered with the impact on prices due to inflation and global events as well as staffing shortages in the airline industry and the related supporting service sector.

PROGRESS ON MOU MEASURES

MOU SCHEDULE NO.1 – GROUND SUPPORT EQUIPMENT

As a key measure identified in the MOU with the South Coast AQMD, the Authority’s Ground Support Equipment (“GSE”) Program requires the Authority to reduce nitrogen oxides (NOx) emissions from ground support equipment to achieve a GSE fleet average composite emissions factor which is equal to or less than 1.66 grams of NOx per brake horsepower-hour (g/bhp-hr of NOx) by January 1, 2023, and 0.74 g/bhp-hr of NOx by January 1, 2031. To achieve this measure, the Authority has been working with airlines and third-party GSE operators to achieve the performance targets by specified dates through accelerated turnover to cleaner equipment.

A list of GSE subject to this measure with the required information specified in MOU Schedule No.1 Section III.B.1. *List of Ground Support Equipment* is provided in **Exhibit A, Table 1**. Information on the sale or retirement of non-zero emission GSE subject to this measure including information submitted to the California Air Resources Board DOORS database and any relocation details (as applicable) as required by MOU Schedule No. 1, Section III.B.2 *List of Sold, Retired, or Relocated Equipment* is also presented in **Exhibit A, Table 2**. Further, as required by MOU Schedule No. 1, Section III.B.3 *Emission Inventory*, an inventory of GSE emissions associated with commercial operations at the Airport has been developed. Additional supporting information for the development of the GSE emissions inventory can be found in **Exhibit B**.

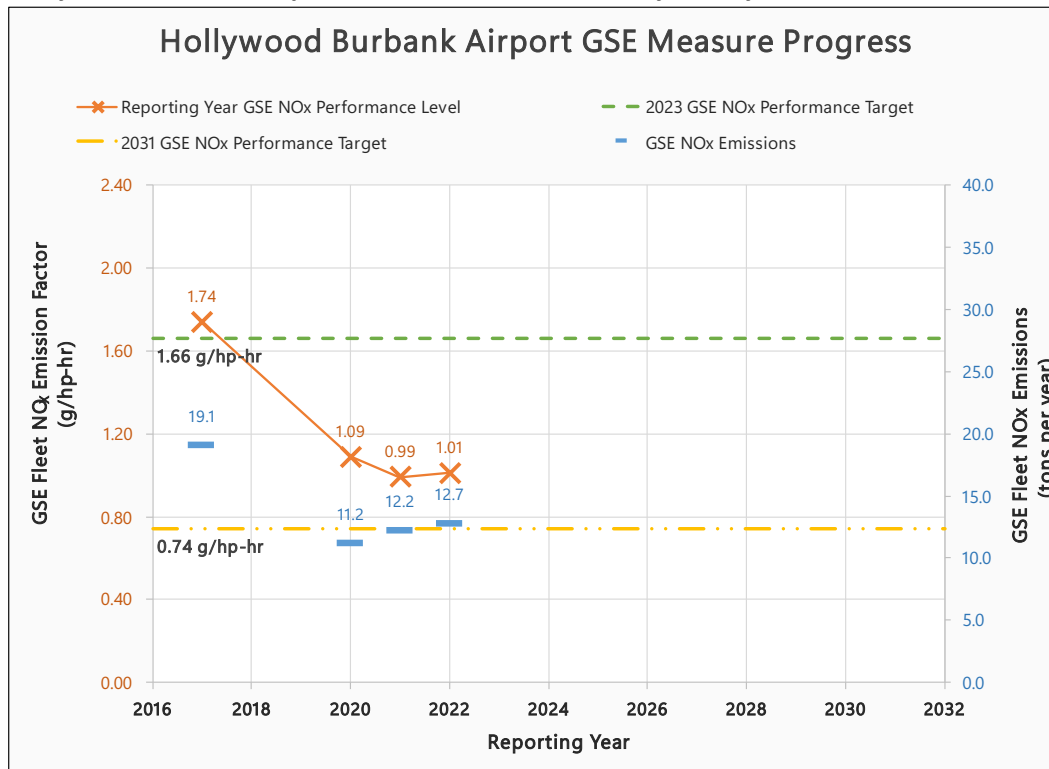
2022 Hollywood Burbank Airport MOU GSE Summary

Fleet Mix ¹					Fleet Emissions (tons per year; metric tons for CO ₂ e) ²						
Total	Electric	Diesel	Gas	Other	CO	ROG	NOx	PM ₁₀	PM _{2.5}	SOx	CO ₂ e
297	121	96	67	13	51.0	5.8	12.7	0.41	0.35	0.01	3,789

Notes:

1. Fleet counts include ≥ 25 horsepower in-use equipment used in the calculation of the NOx performance factor.
2. Fleet emissions include the operation of all reported equipment, including < 25 horsepower and low-use (< 200 hours per year) or emergency-use equipment.

Hollywood Burbank Airport MOU GSE Performance by Survey Year



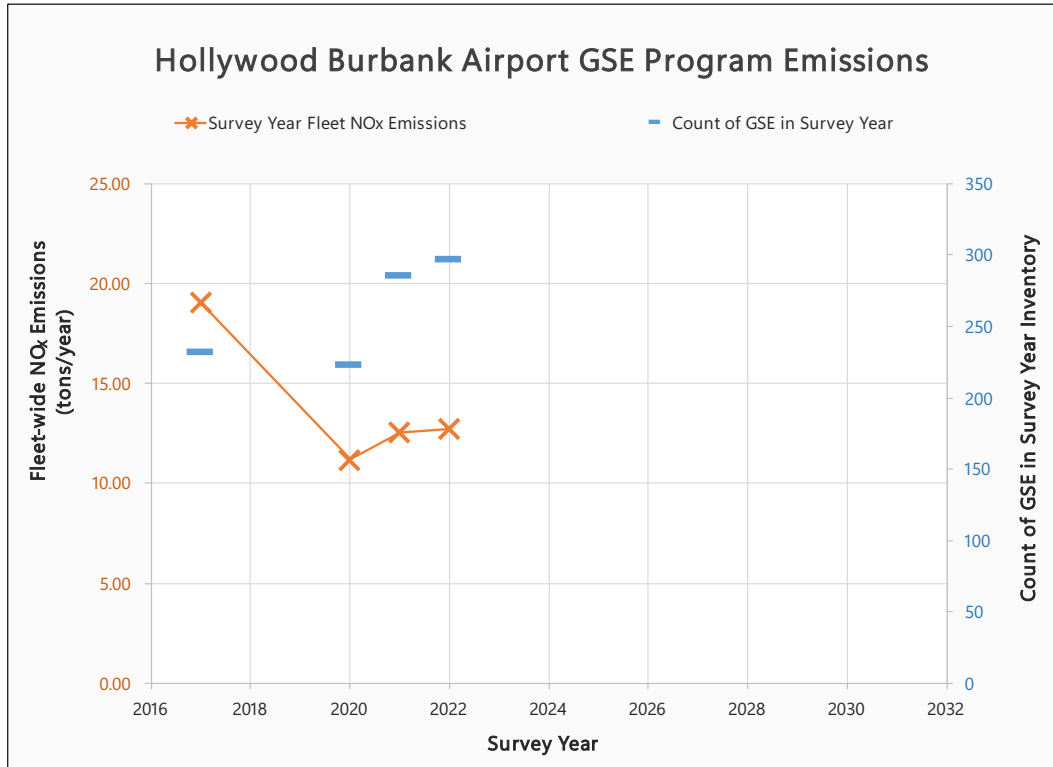
In CY 2022, there were 297 pieces of in-use, ≥ 25 horsepower (i.e., reportable) GSE operating at the Airport – a net increase of 11 pieces of equipment relative to CY 2021. There were also 121 reportable electric ground support equipment (“eGSE”) representing an increase of 4 units, 96 diesel-powered GSE representing an increase of 2 units, 67 gasoline-powered GSE representing an increase of 5 units, and 13 liquefied petroleum gas- or propane-powered GSE representing no change relative to CY 2021. The percentage of eGSE at Hollywood Burbank Airport is 40.9%, unchanged from CY 2021.

In CY 2022, the Airport achieved a fleet average composite emissions factor of 1.01 grams of NOx per brake horsepower-hour, demonstrating the Airport’s continued achievement of the MOU’s January 1, 2023 target ahead of schedule. This factor represents a slight increase relative to the CY 2021 factor of 0.99 grams of NOx per brake horsepower-hour. This slight increase was the result of the departure and arrival of operators with differing GSE fleets at the Airport. The Authority expects the fleet average composite factor to resume its downward trend in future reporting years as the Authority continues to coordinate with third-party GSE operators to replace or relocate older equipment.

For CY 2022, total annual NOx emissions were 12.73 tons, which is slightly higher than the 2021 annual NOx emissions of 12.55 tons. This increase in total annual NOx emissions is directly attributable to the 11-unit increase in reportable GSE operating at the Airport. Overall, the GSE Emissions Reduction Program at the Airport has achieved an annual reduction of 6.34 tons of NOx (33.2 percent) relative to the total annual GSE NOx emissions at the Airport at the time of the Program’s inception. In May 2023,

the Authority initiated further outreach to the operators of the oldest, most polluting GSE currently in operation at the Airport. This outreach is to facilitate the changeout, relocation, or reduced operation of these highest-emitting equipment throughout CY 2023.

Hollywood Burbank Airport MOU GSE Emissions by Survey Year



Methodology – Collection of Data

In March 2023, reporting forms were distributed to all operators of GSE at the airport. Operators were supplied with the final versions of their fleet reporting forms from the previous MOU reporting year and were instructed to provide information on any equipment added to their fleet during the reporting year and to verify the data for the existing fleet, which include the model years, horsepower ratings, equipment categories, fuel types, and other identifying characteristics of the GSE in operation at the airport. Operators were instructed to specify the status of all previously reported equipment and, if the status of that equipment had changed, to indicate the nature of the change (such as a unit of GSE having been scrapped, relegated to emergency use, or relocated to a different airport). Operators were also instructed to provide specific dates for the status change. For equipment relocated to a different airport, operators were instructed to further report to which airport the equipment was relocated.

All operators had completed and submitted the reporting forms by the end of April. Additional follow-up with operators was completed in May.

Each unit of reported GSE was reviewed for accuracy and program applicability based on previously submitted data, MOU requirements, and professional judgement. Non-electric GSE with power ratings

less than or equal to 25 horsepower are exempt from the California Air Resource Board (“CARB”) in-use off-road diesel-fueled (ORD) fleets, and large spark-ignition (LSI) fleets regulations, upon which the MOU’s GSE agreement is predicated and thus were removed from the inventory. Low-use equipment (defined as operating fewer than 200 hours per year), were retained in the inventory for the purposes of determining fleet-total emissions but were not included in the calculation of the fleet-wide grams of NO_x per brake horsepower-hour performance factor. Emergency-use equipment were evaluated as low-use equipment to ensure any emergency equipment use was adequately captured. Quality review was performed for each reported unit and adjustments were made to irregular data. Such adjustments were most commonly: adjustments to engine model year, horsepower, or fuel type data based on discussions with operators and prior inventory reports; and the use of surrogate horsepower or model year data for equipment for which such data was not reported or otherwise attainable from manufacturer specifications or prior reports.

Methodology – Emissions Calculation

The fleet performance factor was estimated using California regulatory standard emissions models, OFFROAD2017 and EMFAC2017, developed by CARB. For each unit of GSE, a representative equipment type was identified from either the OFFROAD2017 model (for off-road engine units) or EMFAC2017 model (for on-road engine units) based on Table 2-3 in the *Hollywood Burbank AQIP Technical Support Document*. Emission factors from the emissions models were queried for the Los Angeles (South Coast) region for CY 2022, assuming all adopted rules for exhaust controls. All fuel types, model years, and horsepower bins (OFFROAD2017 only) were selected, and an aggregated speed was assumed (EMFAC2017 only). Emission factors were assigned to each reported unit of GSE based on the GSE category, model year, horsepower rating, and fuel type of the equipment. For units which were reported without complete horsepower or model year data, the average horsepower or model year for similar equipment in-use at the airport were used.

Emission factors were obtained in units of grams per brake horsepower-hour from OFFROAD2017, and in units of grams per mile from EMFAC2017. For equipment paired to the EMFAC2017 model, an average on-airport speed of 15 miles per hour was multiplied against the model’s emission factor and the resulting factor was divided by a reported equipment’s respective horsepower to convert to the appropriate grams per brake horsepower-hour unit. The resultant factors, with units of grams per brake horsepower-hour, were weighted by reported equipment horsepower and averaged to determine the NO_x fleet performance factor.

On July 12, 2021, it was determined that the publicly available version of CARB’s OFFROAD2017 model did not incorporate the engine-standard requirements associated with CARB’s 2006 LSI rulemaking and subsequent 2010 amendments. These standards required new LSI equipment certified for sale in the state of California to meet stringent emission standards for NO_x and hydrocarbons which far exceeded previous requirements. As a result, LSI engine emissions calculated using the OFFROAD2017 factors resulted in vastly overpredicted emissions, especially for newer equipment. SCAQMD was informed of this discrepancy and discussed the issue with CARB on July 14, 2021. Updated emission factors were developed by CARB based on actual historical engine certifications in the state of California since the 2006 rulemaking came into effect. These updated factors were provided initially on July 16, 2021, and

updated on July 23, 2021, with final load factors and deterioration caps provided on August 13, 2021. These finalized LSI factors were used alongside CARB's ORDAS factors for diesel equipment (which also incorporated the most recent engine standard requirements) to develop the emissions inventory.

Although the emission factors were updated, the fundamental calculation methodology was not changed from the methodology used in the 2017 AQIP and MOU. Equipment categories were paired to each reported unit and emission factors were looked up based on the model year, fuel type, horsepower rating, and equipment category of a given unit. In the CY 2017 MOU calculations, base emission factors were back calculated from the OFFROAD2017 model's tons per year per equipment population outputs. The CARB-provided updated base factors were calculated using zero-hour emissions, emission deterioration rates, fuel correction factors, and load factors. Activity factors were derived from the OFFROAD2017 default activity levels for diesel GSE pairings, except where gasoline & natural gas pairings provided a more specific factor (i.e., for air start GSE units, the activity for gasoline & natural gas "air start units" was used in lieu of the diesel "other GSE" activity). For low-use equipment, the activity level was assumed to be 200 hours per year regardless of the equipment type. Per unit emissions were calculated using the following formula and summed across all equipment listed at the airport to determine the fleet-total emissions:

Emissions (grams per year) = **Activity** (hours per year) × **Power Rating** (horsepower) × **Load Factor** (dimensionless) × {**Zero-hour Emission Factor** (grams per brake horsepower-hour) + [**Deterioration Rate** (grams per brake horsepower-hour per hour) × **Equipment Lifetime Cumulative Operational Hours** (hours)]} × **Fuel Correction Factor** (dimensionless)

MOU SCHEDULE NO. 2 – ZERO-EMISSION SHUTTLE BUS PROGRAM

MOU Schedule No. 2 is based on the Authority's AQIP creditable measure for zero-emission buses at the Airport. This measure requires that the Authority replace 50% and 100% of Authority owned and operated or Authority contracted buses with electric buses by January 1 of 2023 and 2031, respectively.

Shuttle services to all parking lots and staff parking lots were suspended in CY 2020 and resumed in June 2021. At that time, the Authority entered into a short-term contract for courtesy shuttle services with an operator using nine (9) natural gas-powered buses which has been extended through September 2023. In April 2022, the Authority released a Request for Information ("RFI") to gauge the market and availability of electric shuttle buses. Using information gathered from the RFI, the Authority issued a Request for Proposals ("RFP") for a long-term third-party courtesy shuttle bus operation on April 11, 2023. On July 10, 2023, the Authority awarded a five-year contract to ACE Parking for shuttle services to commence on October 1, 2023.

The contract with ACE Parking incorporates the commitments of the MOU, requiring the operator to procure and utilize a minimum of 50% electric buses and to install the necessary EV chargers to support the operation of that fleet. The contract requires the operator to meet these commitments within 18 months of the contract award, or by April 2025. Any interim bus operations by ACE Parking during the electric bus and charger procurement process are required to utilize alternative fuels, such as CNG, and must be of a model year fewer than 9 years old. An RFP for shuttle services following the conclusion of

the current contract will include requirements to meet the Airports 100% electric shuttle commitment by 2031.

As required by this measure, a list of shuttle buses operating at the Airport with the required information specified in MOU Schedule No.2 Section III.B.1. Shuttle Bus List is provided in **Exhibit B, Table 1**. Further, as required by MOU Schedule No.1, Section III.B.2., an emissions inventory for shuttle buses has been developed. Additional supporting information for the development of the shuttle bus emissions inventory can be found in **Exhibit C**.

2022 Hollywood Burbank Airport MOU Shuttle Bus Summary

Fleet Mix		Fleet Emissions (tons per year; metric tons for CO ₂ e)						
Electric	Natural Gas	CO	ROG	NO _x	PM ₁₀	PM _{2.5}	SO _x	CO ₂ e
0 (0%)	9 (100%)	14.31	0.03	0.14	0.03	0.01	<0.01	650

Methodology – Collection of Data

In March 2023, the data required under MOU Measure 2.III. B.1. was requested from the currently contracted Authority shuttle bus operator for equipment operating at the Airport. All requested data was received by the end of April 2023.

Methodology – Emissions Calculation

Shuttle bus operating emissions were estimated using California regulatory standard emissions model EMFAC2017, developed by CARB. For each shuttle bus, a representative equipment type was identified from the EMFAC2017 model. Emission factors from the model were queried for the Los Angeles (South Coast) region for CY 2022, assuming all adopted rules for exhaust controls. Emission factors were assigned to each reported shuttle bus based on the buses representative EMFAC category and the vehicle's model year from the applicable fuel types within the EMFAC model.

Emission factors from the EMFAC model were verified against emission factors calculated using base factors available in applicable CARB's engine certifications and Annual emissions for each shuttle bus were calculated by multiplying emission factors (in grams per mile) by annual reported vehicle miles traveled (VMT).

The Authority truly appreciates the partnership with South Coast AQMD and the ongoing collaboration. If there are any questions, please contact either myself at mmartinez@bur.org (818) 729-2226 or Tami McCrossen-Orr at tami@trifiletticonsulting.com (310) 709-9637 at your earliest convenience.

Sincerely,



Maggie Martinez
Director, Noise and Environmental Affairs

Enclosed are the following documents.

- Exhibit A: MOU Schedule No. 1 – Ground Support Equipment MOU Report
- Exhibit B: MOU Schedule No. 1 – Ground Support Equipment Survey, Emissions Inventory Report, October 2023
- Exhibit C: MOU Schedule No. 2 – Shuttle Bus MOU Report