



LOS ANGELES INTERNATIONAL AIRPORT 2020 YEAR REPORT ON MOU IMPLEMENTATION

Summary and Data Report

Los Angeles International Airport (“LAX”, “Airport”) has prepared the annual report as requested by the South Coast Air Quality Management District (“South Coast AQMD”). On December 13, 2019, a Memorandum of Understanding (“MOU”) was entered into by the South Coast AQMD and the Airport. The purpose of this annual report is to quantify the estimated emission reduction benefits in the Basin through implementation of the three (3) voluntary LAX measures from LAX’s Air Quality Improvement Measures (AQIM). This MOU does not create State Implementation Plan (SIP) creditable reductions; rather, it identifies specific voluntary measures and provides the means for the South Coast AQMD to quantify the emission reductions from the MOU Measures to obtain SIP credits.

There are three measures in the LAX MOU, as related to non-aircraft commercial passenger airport mobile sources. LAX monitors the implementation of the MOU Measures and provides data and annual emissions inventory reports to South Coast AQMD as specified in MOU Attachment A for Measures 1 to 3. The report does not apply to any source or operation of any source that is not specifically identified in the MOU Measures.

The 2020 data is the first reporting year and intended to establish a program baseline; however, in February 2020, the novel coronavirus (COVID-19) emerged and significantly disrupted airport operations. Air travel has decreased and the outlook for recovery remains uncertain for the airport. The airport, airlines, ground support equipment (“GSE”) operators, and many related third parties had to re-evaluate capital plans and allocation of resources. The 2020 data is better represented as an anomaly instead of a baseline year.

MEASURE NO. 1 - GROUND SUPPORT EQUIPMENT EMISSIONS REDUCTION POLICY

MOU Measure No. 1 is a measure for ground support equipment. This measure requires that all ground support equipment operators at LAX achieve fleet average NO_x + Hydrocarbon emission factors of 1.8 and 1.0 grams per brake horsepower-hour (g/bhp-hr) by January 1, 2023 and January 1, 2031, respectively. To achieve this measure, the Airport has been working with Airport tenants to achieve the performance targets by specified dates through accelerated turnover to cleaner equipment.

The 2020 report shows the fleet averaged NO_x emission factor for commercial GSE at LAX is 1.52 g/bhp-hr, which is lower than the 2017 AQIM baseline fleet averaged NO_x emission factor of 2.24 g/bhp-hr and exceeded (i.e., is better than) the 2023 target.

A summary table comparing the number of equipment by fuel type showed the electric count has decrease from 2020 to 2017; however, there are fewer pre-2010 electric and more 2010 and newer in the fleet. Operator's fleet mix showed a higher inventory of newer (2016 to present) gasoline and clean diesel ground support equipment.

	2017				2020				Changes between 2020 and 2017			
	Gasoline	LPG/ Propane	Electric	Diesel	Gasoline	LPG/ Propane	Electric	Diesel	Gasoline	LPG/ Propane	Electric	Diesel
2009 or older	321	217	698	398	231	122	472	307	-90	-95	-226	-91
2010-2015	127	107	220	175	163	173	237	187	36	66	17	12
2016 to present	143	68	134	109	438	201	344	290	295	133	210	181

A summary table comparing Tier level (for diesel equipment) in 2017 and 2020 shows transition in operator's fleet mix from older engines to newer equipment.

CARB Engine Tiers Comparison by Year (Diesel and Off-Road only)			
<i>Engine Tier</i>	<i>2017</i>	<i>2020</i>	<i>Changes between 2017 and 2020</i>
Tier 0	40	25	-15
Tier 1	156	111	-45
Tier 2	72	45	-27
Tier 3	147	83	-64
Tier 4int	65	63	-2
Tier 4	166	325	159

The 2017 fleet performance factor and existing 2023/2031 GSE performance targets identified in the 2017 AQIP/AQIM and the MOU were developed using a methodology that uses NOx engine standards. The 2020 fleet performance factor was calculated in the same manner.

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 NOx 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 were updated on July 23, 2021 with final load factors and deterioration caps provided on August 13, 2021. These finalized LSI factors were used with CARB's ORDAS factors for diesel (which also incorporated the most recent engine standard requirements) were used 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/AQIM and MOU. Equipment categories were paired to each reported unit and emission factors were looked up based on the model year, fuel type, horsepower, and equipment category of a given unit. In the calendar year 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)

This report contains all of the elements required in the MOU and neither emission factor calculation methodology nor the performance targets were amended. LAX will continue to work with airlines and third party GSE operators to encourage the continued conversion of GSE, and to support any future electrical infrastructure changes that maybe necessary.

MEASURE NO. 2 - LAX ALTERNATIVE FUEL VEHICLE INCENTIVE PROGRAM

MOU Measure No. 2 is a measure based on LAX's AQIM measure, the LAX Zero and Near-Zero Emission Heavy-Duty Vehicle Incentive Program and is attached to and a part of the MOU between LAX and South Coast AQMD. LAX will implement an incentive program that will distribute up to \$500,000 dollars in funding to applicants based on the "incremental cost" differential of the zero or near-zero emission vehicles as compared to conventionally-fueled equivalents with a Gross Vehicle Weight Rating (GVWR) of 14,000 pounds or greater by December 31, 2021.

In 2020, LAX has distributed \$305,000 in 2020 for 14 vehicles. LAX has ensured full subscription of the incentive program to 7 applicants with replacement of 23 vehicles.

MEASURE NO.3 – ZERO-EMISSION BUS PROGRAM

MOU Measure No. 3 is a measure based on LAX's AQIM measure, the LAX Zero- Emission Bus Program to convert Airport-owned buses at LAX to zero-emission buses and is attached to and a part of the MOU between the Airport and South Coast AQMD. The Measure requires LAX to replace 20% and 100% of the Airport-owned and operated buses with zero-emission buses by January 1, 2023 and January 1, 2031, respectively.

In 2020 LAX reported 136 buses in its fleet. Of the 136 buses, 20 are electric buses (14% of its bus fleet) and 12 are 1996 diesel buses that have been scrapped. The 12 diesel buses that have been scrapped showed little to no usage in 2020. The electric buses are dedicated airfield buses and have short routes used to transport passengers between the Remote Gates and the Bradley International Terminal. The bus charging infrastructure came online in March 2020 at which time Airport operations began to decrease due to COVID; the electric buses were not deployed at its intended capacity. Most of the 2020 annual Vehicle Miles Travel (VMT) are attributed to the CNG vehicles operated in the Central Terminal Area. The annual VMT shows similar anomalous reduction and should not be compared to the 2017 AQIM baseline for meaningful trend analysis.

2020 Data Report