

# Commercial Airports – Facility-Based Mobile Source Measures



3<sup>rd</sup> Working Group Meeting  
October 4, 2017

FBMSM

# Agenda

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- Background
- FBMSM Development Framework
- Commercial Airport Emissions Inventory
- Emission Reduction Opportunities
- Next Steps

# Background



- 2016 AQMP adopted March 2017
- Facility-Based Mobile Source Measure (MOB-04): Emission Reductions at Commercial Airports



- Key topics discussed at previous working group meetings:
  - FBMSM Process
  - FBMSM Development Framework
  - SIP credit
  - Regulations, others

FBMSM Development Framework						
Background Information			Strategies (Discussion Topics for Working Groups)		Implementation (Discussion Topics for Working Groups)	
Emission Sources	Regulations & Other Commitments	Technologies	Emission Reduction Opportunities	Financial and Other Incentives*	Implementing Mechanisms	SIP Credit
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# Background – FBMSM Development Framework

- Stakeholders have requested more information on:
  - Assumptions in 2016 AQMP emissions inventory
  - Cost-effectiveness of proposed emission reduction measures

<b><u>Background Information</u></b>			<b><u>Strategies</u></b> <i>(Discussion Topics for Working Groups)</i>		<b><u>Implementation</u></b> <i>(Discussion Topics for Working Groups)</i>	
<i>Emission Sources</i>	<i>Regulations &amp; Other Commitments</i>	<i>Technologies</i>	<i>Emission Reduction Opportunities</i>	<i>Financial and Other Incentives*</i>	<i>Implementing Mechanisms</i>	<i>SIP Credit</i>
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<i>Emissions Inventory</i>
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<i>Cost-Effectiveness</i>
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# Key Considerations with FBMSM-Related Emissions Inventories

- Assumptions used in emissions inventory important to understand when developing and evaluating emission reduction opportunities
- Many facility-based emission reduction opportunities are local, whereas AQMP inventory is regional
- Common adjustments to AQMP emissions inventory:
  - Changes in assumptions (e.g., growth forecast, etc.)
    - Assumptions may affect both the base year and future baseline years
  - Emission reduction measures (e.g., new regulations, voluntary measures that satisfy SIP integrity elements, etc.)

## “Top-Down”

- Statewide emissions applied to subareas based on surrogates
  - Example: GSE emissions are reported statewide (DOORS), then allocated by air basin based on flight activity

## “Bottom-Up”

- Local data used to generate facility-specific profiles
  - Example: Aircraft emissions calculated using airport-specific activity data

# Key Emissions Inventory Assumptions – 2012 Base Year

## Aircraft Emissions

- Aircraft-specific emissions inventory based on airport-specific data

## On-Road Emissions

- CARB EMFAC 2014 emission factors applied to travel activity data provided by SCAG

## Off-Road Emissions

- Provided by CARB for multiple source categories (e.g., ground support equipment, construction equipment, etc.)

# Key Emissions Inventory Assumptions – Future Baseline

## Growth Forecast

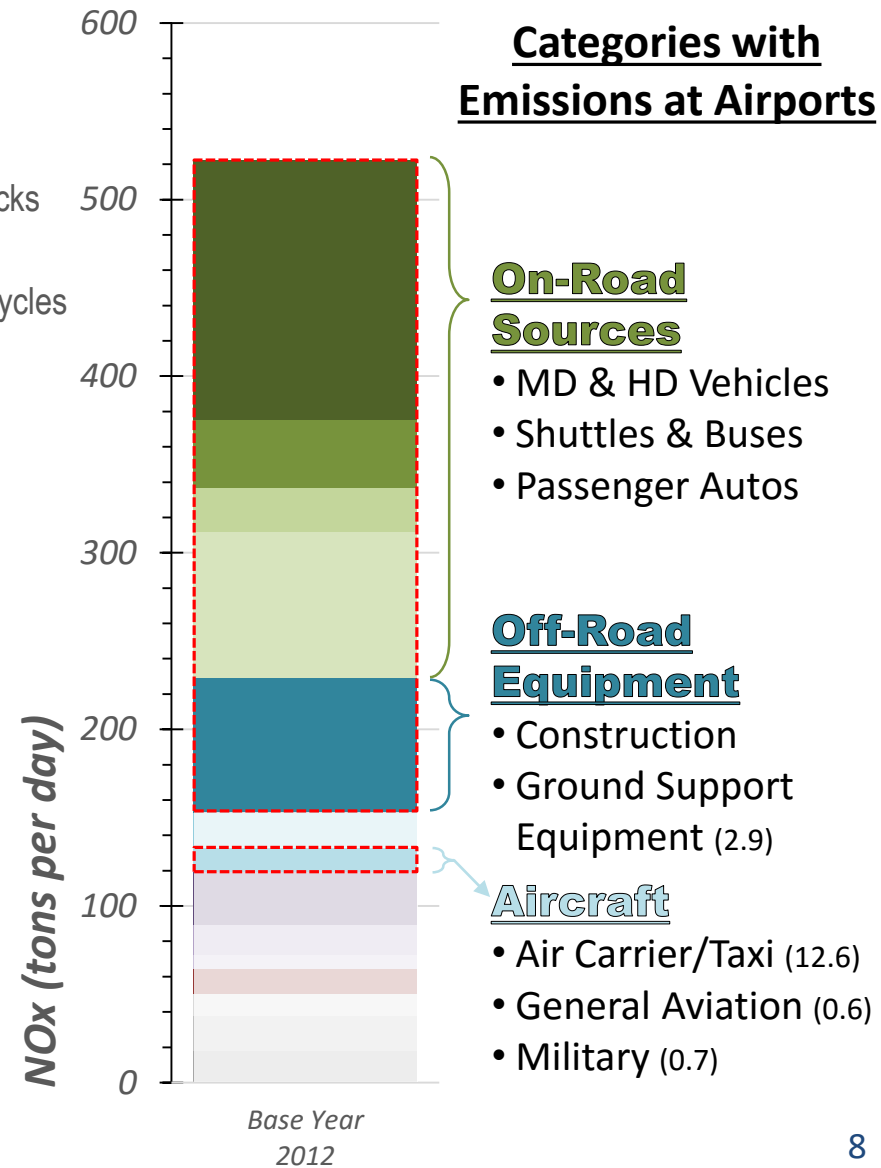
- Primarily based on demographic and economic growth projections provided by Southern California Association of Governments (SCAG)

## Regulations

- Baseline emissions inventory accounts for emissions reductions resulting from:
  - SCAQMD regulation adopted or amended by December 2015, and
  - CARB regulations adopted by November 2015

# 2016 AQMP – Base Year NOx Emissions

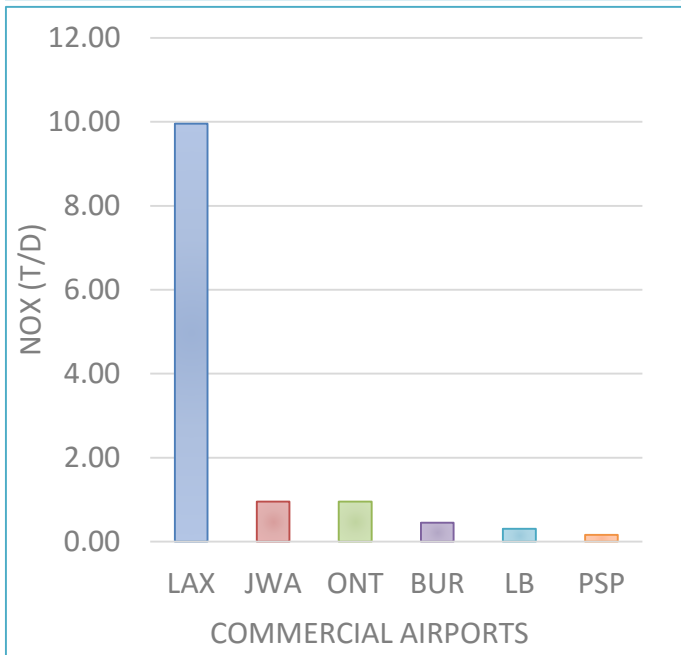
- Heavy-Duty Diesel Trucks
- Medium-Duty & Heavy-Duty Gas Trucks
- Buses
- Cars/Light-Duty Trucks/SUVs/Motorcycles
- Off-Road Equipment and Vehicles
- Locomotives
- Aircraft
- Ocean Going Vessels
- Commercial Harbor Craft
- Recreational Boats
- Residential Fuel Combustion
- Industrial Fuel Combustion
- RECLAIM
- Other Stationary



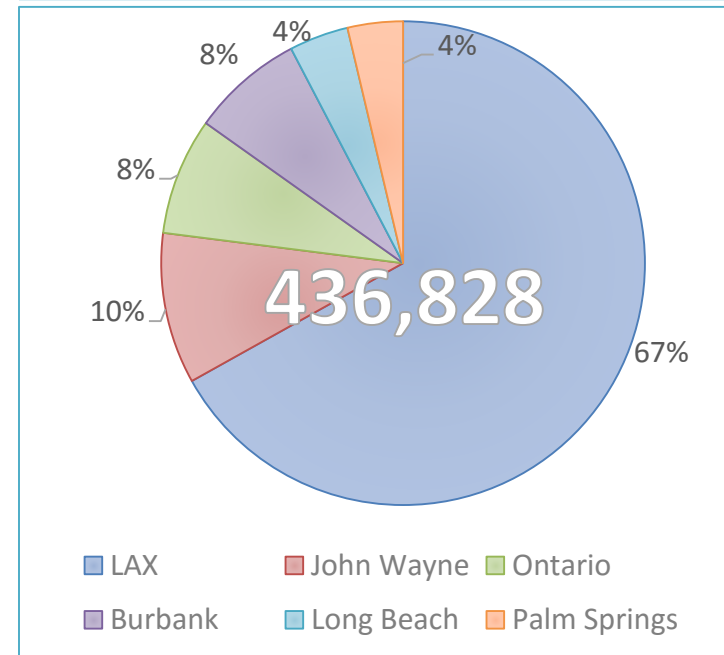


# Base Year Emissions Inventory Information – Aircraft

## Base Year NOx Emissions - Aircraft



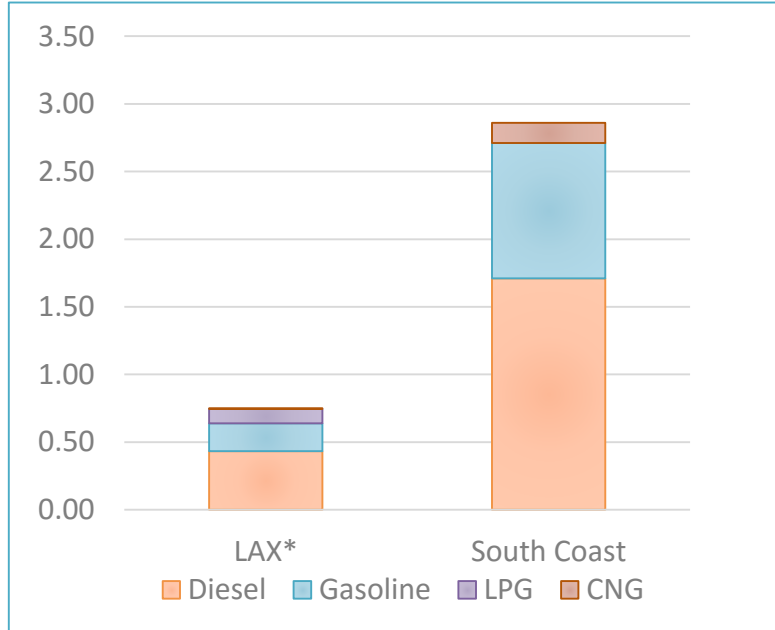
## Base Year Annual Aircraft Landing & Take-Off Cycles (LTOs)\*



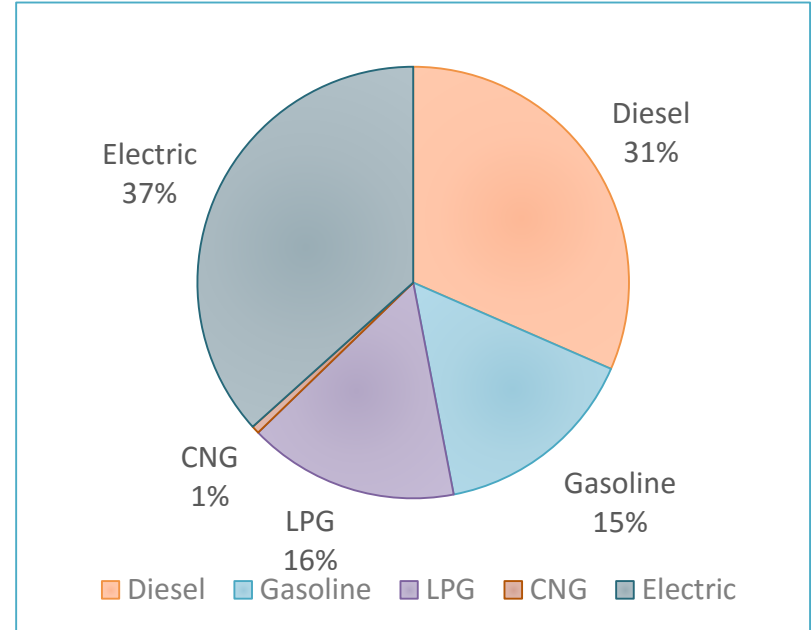
\*Air Carrier and Air Taxi only – accounts for ~90% of aircraft NOx inventory

# Base Year Emissions Inventory - GSE

## GSE NOx Emissions (tons/day)



## LAX GSE FLEET MAKE-UP\*



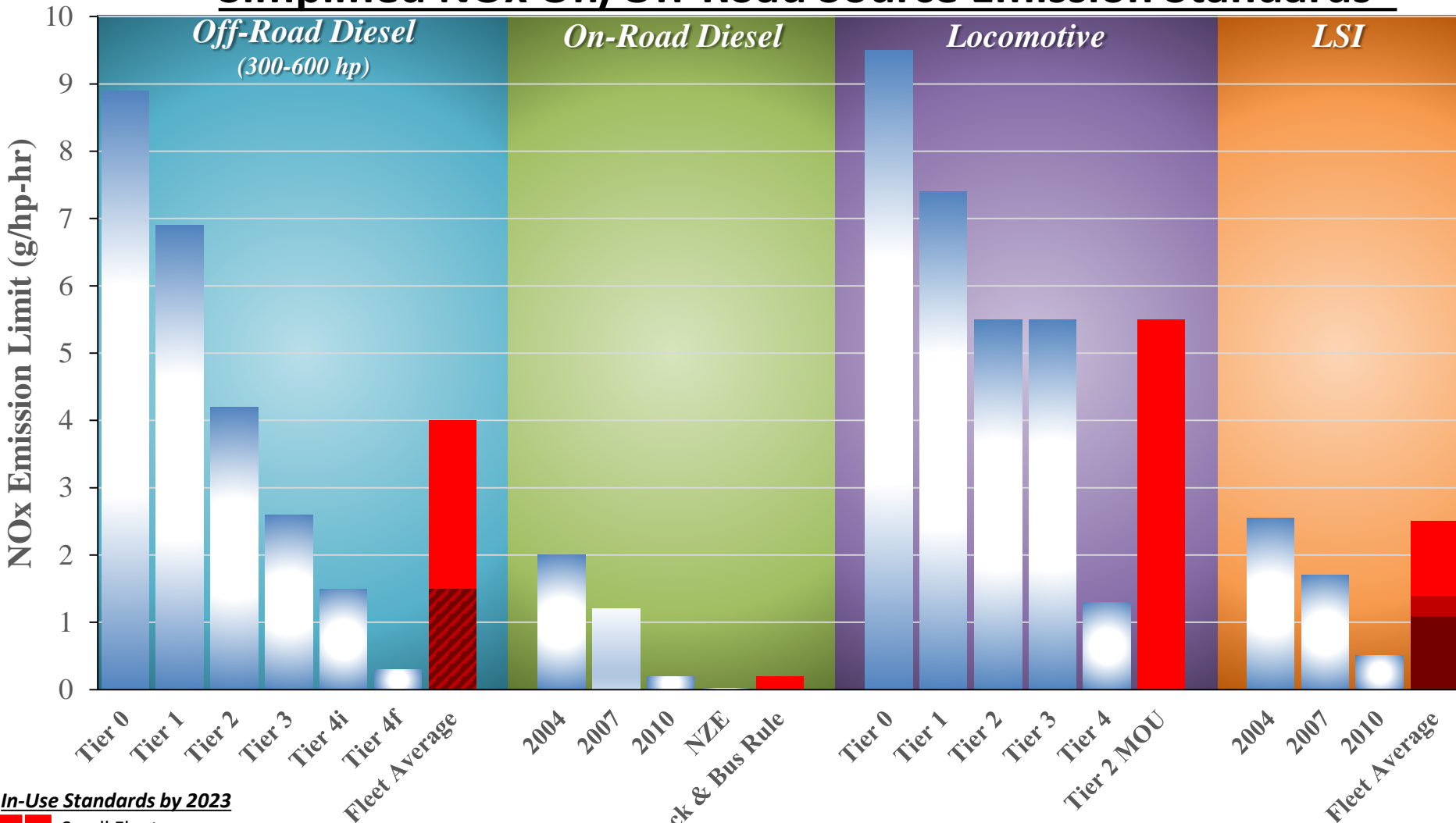
\*Unaudited inventory information provided by LAX

# Emissions Inventory Assumptions & Potential Opportunities – Aircraft

Emissions Source	Emissions Inventory Assumptions	Potential Emission Reduction Opportunities
<ul style="list-style-type: none"> <li>➤ Aircraft*</li> </ul>	<ul style="list-style-type: none"> <li>➤ Activity data from airports, FAA database, and SCAG               <ul style="list-style-type: none"> <li>➤ 1.6% annual growth</li> </ul> </li> <li>➤ Emission rates based on:               <ul style="list-style-type: none"> <li>➤ FAA EDMS model where detailed activity data available</li> <li>➤ EPA average emission factors by major aircraft type for other airports</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Single engine taxiing</li> <li>➤ Aircraft fuel-efficiency</li> <li>➤ Operational improvements to facilities</li> <li>➤ Potential inventory improvement:               <ul style="list-style-type: none"> <li>➤ Aircraft emission factors EDMS -&gt; AEDT</li> </ul> </li> </ul>

***\*Does not include measures that affect in-flight aircraft activities***

# Simplified NOx On/Off-Road Source Emission Standards\*



**In-Use Standards by 2023**

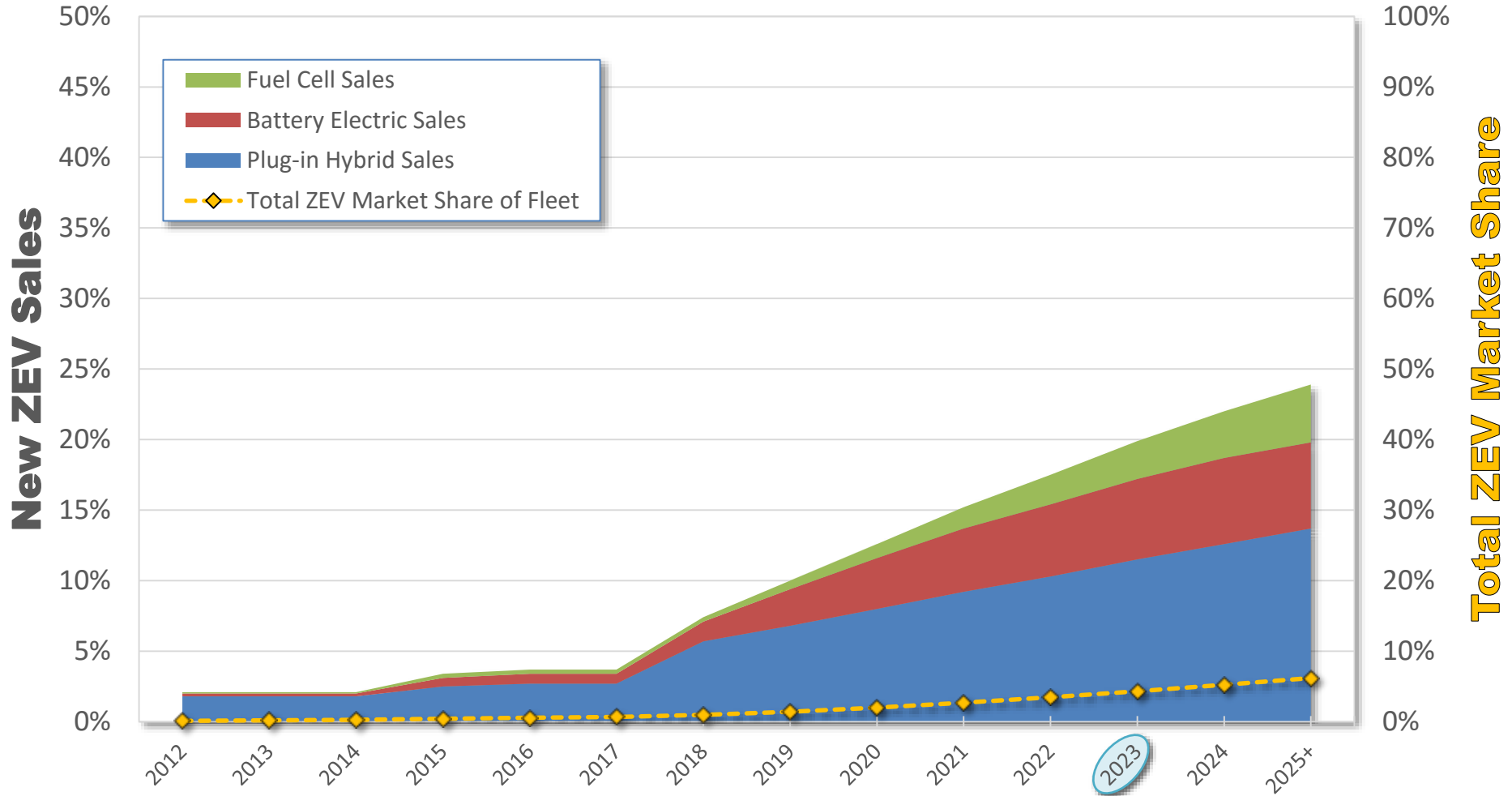
- Small Fleet
- Medium Fleet
- Large Fleet

\*Many unique provisions affect individual fleets. Original regulations should be consulted for compliance purposes.

# Emissions Inventory Assumptions & Potential Opportunities – Off-Road

Emissions Source	Emissions Inventory Assumptions	Potential Emission Reduction Opportunities
<ul style="list-style-type: none"> <li>➤ GSE</li> </ul>	<ul style="list-style-type: none"> <li>➤ Activity data based on:               <ul style="list-style-type: none"> <li>➤ DOORS data, surveys</li> </ul> </li> <li>➤ Activity growth based on:               <ul style="list-style-type: none"> <li>➤ Historic trend of airline fuel use, ~1.8%</li> </ul> </li> <li>➤ Emission rates based on:               <ul style="list-style-type: none"> <li>➤ DOORS reporting</li> <li>➤ LSI rule, Off-road rule</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Accelerate implementation of ARB requirements for GSE               <ul style="list-style-type: none"> <li>➤ CARB state strategy proposes phase-in of zero emissions for some GSE beginning in 2023</li> </ul> </li> <li>➤ Potential inventory improvement:               <ul style="list-style-type: none"> <li>➤ Updated fleet information from airports</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>➤ Construction Equipment</li> </ul>	<ul style="list-style-type: none"> <li>➤ Emission rates based on:               <ul style="list-style-type: none"> <li>➤ 2011 ARB Off Road Equipment Model</li> <li>➤ Other sources such as ARB Off-Road 2007 model</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>➤ Low emission construction equipment policy</li> </ul>

# Baseline SIP Inventory Zero Emission Vehicle Market Penetration (EMFAC)



*~10 million light duty vehicles  
in total fleet in 2023*

# Emissions Inventory Assumptions & Potential Opportunities – On-Road

Emissions Source	Emissions Inventory Assumptions	Potential Emission Reduction Opportunities
<ul style="list-style-type: none"> <li>➤ Delivery Trucks</li> </ul>	<ul style="list-style-type: none"> <li>➤ Emission factors from EMFAC 2014</li> <li>➤ Activity data from SCAG RTP</li> </ul>	<ul style="list-style-type: none"> <li>➤ LAX Alternative Fuel Policy</li> <li>➤ Zero or near-zero engines</li> </ul>
<ul style="list-style-type: none"> <li>➤ Terminal Traffic</li> </ul>		<ul style="list-style-type: none"> <li>➤ Increased public transportation to airports</li> <li>➤ Electric plug-in programs</li> <li>➤ Shuttle service programs</li> <li>➤ Increased ZE/NZE shuttles (e.g., proposed CARB regulation)</li> </ul>
<ul style="list-style-type: none"> <li>➤ Facility Fleet</li> </ul>		<ul style="list-style-type: none"> <li>➤ Zero or near-zero emissions fleet modernization programs                             <ul style="list-style-type: none"> <li>➤ Must go beyond SCAQMD Rule 1194</li> </ul> </li> </ul>

# Emissions Inventory – Additional Information Needed from Airports

- Detailed emissions information by airport
  - Off-road: ground support equipment inventories
  - On-road: terminal traffic, commercial activity (e.g., delivery trucks, facility fleets, etc.)
- Summary of commercial airport data available to SCAQMD:

Airport	Aircraft Emissions	Airport On-Road Fleet	GSE
LAX	✓	Partial	✓
Long Beach	✓		
Burbank	✓		
Ontario	✓		
Orange County	✓		
Palm Springs	✓		



# Next Steps

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- Before March 2018 report to Board, staff needs the assistance of stakeholders to:
  - Obtain detailed emissions information (e.g., existing facility-specific inventories)
  - Identify specific voluntary emission reduction commitments
- Develop voluntary and regulatory concepts
- Progress Report to Mobile Source Committee

# Staff Contacts

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- Ian MacMillan  
Planning and Rules Manager  
(909) 396-3244  
[imacmillan@aqmd.gov](mailto:imacmillan@aqmd.gov)
- Dan Garcia  
Program Supervisor  
(909) 396-3304  
[dgarcia@aqmd.gov](mailto:dgarcia@aqmd.gov)