

Off-Road Large Spark-Ignition (LSI) Equipment Regulation Proposed Amendments Public Workshop

Date and Time	Location
June 8, 2015 - 10:00 am - 12:00 pm PDT	Cal EPA Building Byron Sher Auditorium Sacramento, CA 95812
June 10, 2015 - 10:00 am - 12:00 pm PDT	San Joaquin Valley Air Pollution Control District Auditorium 1990 E. Gettysburg Ave. Fresno, CA 93726
June 12, 2015 - 10:00 am - 12:00 pm PDT	South Coast Air Quality Management District Auditorium 21865 Copley Drive Diamond Bar, CA 91765

California Environmental Protection Agency

Air Resources Board



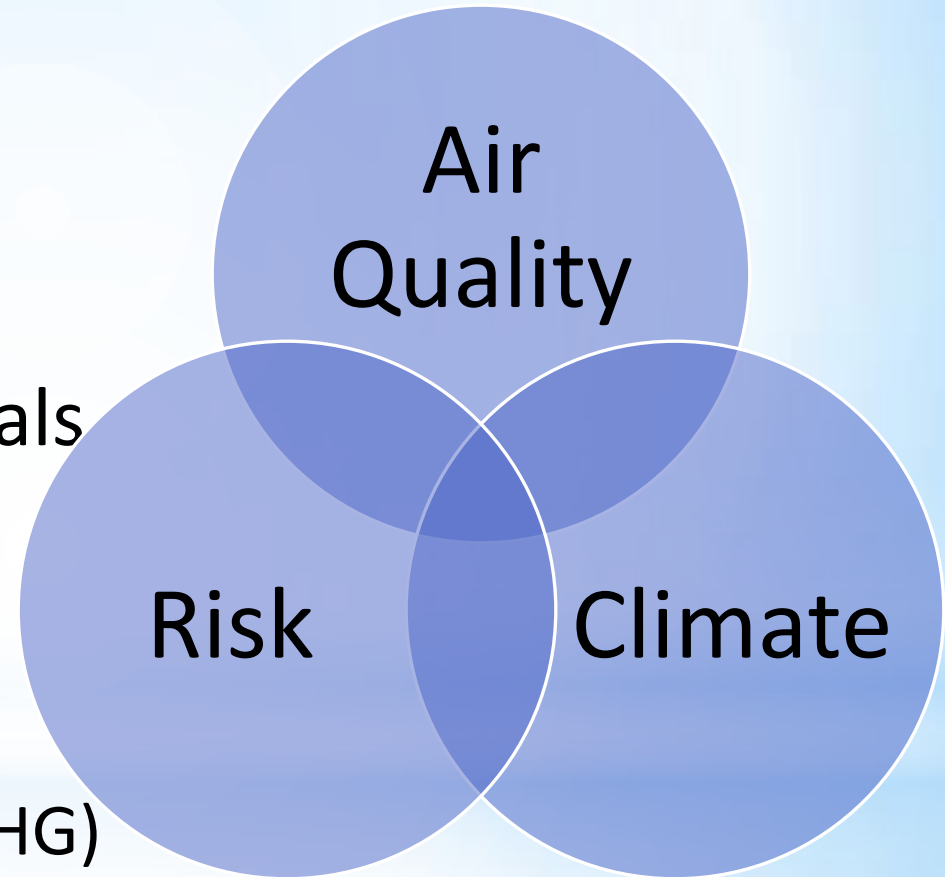
Overview

- Introductions
- Background
- Current LSI Regulation
- Proposed Amendment Concepts
- Important Dates/
Contact Information
- Discussion



Need for Emission Reductions

- Minimize Near-Source Health Risk
- Help Meet California Goals
 - 90% Oxides of Nitrogen (NO_x) by 2032
 - 50% Petroleum by 2030
 - 80% Greenhouse Gas (GHG) by 2050



ARB Sustainable Freight Plan



Significant Opportunities for Zero-Emission Deployments

Long-term Goal: Expand zero emission, where feasible, in off-road sector through a coordinated incentive and regulatory approaches

- Roughly 50% of forklifts are already electrified
- 90-95% of forklifts with up to 8,000 lbs. lift capacity (~3/4 of market) can operate using today's zero-emission technology without significant change in workflow
- Fuel cell forklifts: ~5,000 in U.S.
<1% zero-emission forklift market

Large Spark-Ignited (LSI) Regulation

LSI Engine Emission Standards

- Gasoline, Propane, CNG
- 25hp or greater, >1L displacement
- Self-propelled



Fleet Average Requirements

- Forklifts
- Industrial Tractors
- Sweepers/Scrubbers
- Airport Ground Support Equipment (GSE)

Estimated Statewide LSI Emissions

LSI Equipment Emissions Statewide Annual Average in tons per day (t/d)

Year	Population	HC	NOx
2004	87,687	15.4	54.8
2010	92,104	7.5	28.3
2020	96,964	4.4	19.0

LSI Equipment Emissions Top Three Equipment Categories (t/d)

Equipment Category	2004		2010		2020	
	HC	NOx	HC	NOx	HC	NOx
Industrial Forklifts	11.8	40.4	5.3	19.9	3.4	15.6
Airport GSE	0.6	3.3	0.3	1.5	0.2	1.0
Sweeper/Scrubbers	0.2	0.8	0.1	0.3	0.1	0.2

Controlling LSI Engine Emissions

- New Engine Emission Requirements
- Automotive – style controls
- Three-way catalytic converters
- Fuel/Air Control
- Retrofit kits available for older engines
(Model Year (MY) 1980 – 2003)

LSI Fleet Average Requirements

- Forklifts
- Sweepers/Scrubbers
- Industrial Tow Tractors
- Airport GSE
- Powered by LSI Engine



Forklift

For the purposes of the LSI Fleet Regulation

“Forklift” means:

- Electric Class 1 or 2 rider truck
- LSI engine-powered Class 4 or 5 rider truck

“Forklift” does not mean:

- Electric Class 3 truck (e.g., pallet jacks & walkies)
- Man lifts, scissors lifts, and bucket/boom lifts

Sweeper/Scrubber

- “Sweeper/scrubber” means an electric motor powered or large spark-ignition engine-powered piece of industrial floor cleaning equipment
- Designed to vacuum up small debris (litter) and/or scrub and squeegee the floor



Industrial Tow Tractor

- “Industrial Tow Tractor” means an electric motor or LSI engine **Class 6** truck as defined by the Industrial Truck Association
- Designed primarily to push or pull non-powered trucks, trailers, or other mobile loads on roadways or improved surfaces
- Commonly referred to as tow motors or tugs
- Tow tractors used at airports are included in GSE Fleet definition

Airport Ground Support Equipment (GSE)

- LSI engine
- Some electric-powered equipment
- 23 subcategories

Air Conditioner	Cart	Lavatory Cart
Air Start	Catering Truck	Lavatory Truck
Aircraft Tractor	De-icer	Lift
Baggage Tractor	Fork Lift	Passenger Stand
Belt Loader	Fuel Truck	Service Truck
Bobtail	Generator	Sweeper
Cargo Loader	Ground Power Unit	Water Truck
Cargo Tractor	Hydrant Truck	

- Includes “On-Road Equivalent GSE,” those pieces of GSE designed for, but not licensed for on-road use

Exemptions to the LSI Fleet Regulation

- Small Fleets
 - 3 or fewer forklifts, and/or
 - 3 or fewer pieces of non-forklift LSI engine equipment
- In-field forklifts
- Rental or leased equipment operated 30 or fewer aggregated calendar days per year
- Tactical support equipment

Fleet Size/Type Considerations

- Two Separate fleets
 - Forklift
 - Non-forklift
 - For each, include electric equipment
- Forklift fleets
 - Medium (4-25)
 - Large (26+)
- Equipment must be added together into a single fleet if procurement decisions and/or budgeting for facility locations occur at a higher corporate level.

Fleet Average Emission Standards

Fleet Average Emission Level Standard in Grams HC+NO_x per kilowatt-hour (g/kW-hr) (brake horsepower-hour)

LSI Fleet Type	Number of units	By 1/1/2009	By 1/1/2011	By 1/1/2013
Forklift – large fleet	26+	3.2 (2.4)	2.3 (1.7)	1.5 (1.1)
Forklift – mid-size fleet	4-25	3.5 (2.6)	2.7 (2.0)	1.9 (1.4)
Non-forklift – GSE, tow tractor, sweeper	4+	4.0 (3.0)	3.6 (2.7)	3.4 (2.5)

* GSE forklifts must comply with the forklift standards

Fleet Average Exclusions

- Limited Hours of Use
 - Less than 200 based on prior year
- Rental or lease equipment where:
 - Agreement is less than one year; and
 - Meets a 2.7 g/kW-hr standards; and
 - No more than 20 % of fleet (otherwise, the exclusion applies only to first 20%)
- Boneyard and Retired equipment

Calculating the Fleet Average

- Not based on hours of use, hp, or source test
- Straight average of HC+NO_x certification/verification standards or a default value for uncontrolled engines

Engine Category	HC+NO _x Emission Factor
Pre-2001 model years	16.0 g/kW-hr (12.0 g/bhp-hr)
Uncontrolled 2001-2003 MY	
Controlled 2001-2003 MY	4.0 g/kW-hr (3.0 g/bhp-hr)
2004 to 2006 MY	
2007 to 2009 MY	0.8 - 2.7 g/kW-hr (0.6 - 2.0 g/bhp-hr)
2010+ MY	0.8 g/kW-hr (0.6 g/bhp-hr)

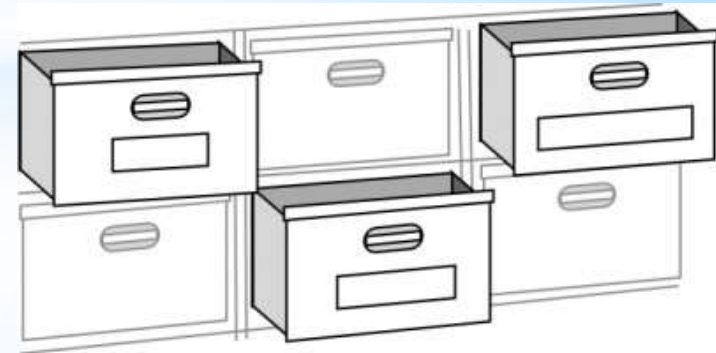
Special Provisions

- Equipment Dealers Provisions
- Specialty Equipment Exemptions
- Agricultural Provisions
- GSE Provisions



Recordkeeping Requirements

- Current LSI regulation has no reporting requirements
 - Baseline inventory Nov. 2007
 - Contents: vehicle/engine make, model, serial number, certification, or verification level as shown on label
 - May be retained at a centralized location
- Records of fleet inventories through June 30, 2016



Near-Term Objective

- Provide needed State wide emission inventory updates
- Facilitating uniform compliance between all LSI fleets
- Identifying current zero emission incentive opportunities
- Open to alternatives to achieve the same goal
 - Agriculture
 - Airport GSE

Proposed LSI Regulatory Amendment Concepts

- Registration and Reporting
- Labeling
- Other Minor Regulatory changes
 - Improve clarity
 - Maintain incentive funding availability

Proposed LSI Registration and Reporting Requirements

- Maintain current applicability
 - Forklifts, GSE, sweepers/scrubbers, and industrial tow tractors
 - Large and Medium fleets
- Expand current recordkeeping to a reporting requirement
- Utilize Diesel Off-Road On-line Reporting System (DOORS)

Proposed LSI Labeling

- Propose labeling one label on back of LSI equipment
- Equipment Identification Number (EIN) is white with BLUE background
- Each character will be 3 inches high x 1.5 inches in width

Key Activities and Contacts

- LSI Reporting Amendments
 - Workshops (Summer/Fall 2015)
 - Workgroups as requested
 - Board Item (May 2016)
- Todd Sterling – Staff Lead
916-323-2397 Todd.Sterling@arb.ca.gov
- John Kato – Manager
916-322-2891 John.Kato@arb.ca.gov



Discussion