

ARB's Draft Proposed Innovative Technology Regulation

Public Workshop
El Monte, California
July 13, 2016

ARB's Draft Proposed Innovative Technology Regulation

These slides and language are only intended to encourage stakeholder feedback and should not be construed as a formal regulatory proposal. Any stakeholder feedback submitted prior to the '45-day' formal comment period will not be considered part of the official rulemaking record. If you would like any feedback submitted to be considered part of the record, you must re-submit it during the formal public comment period.

*Webcast Participants please email questions or comments to
gotomeeting3@arb.ca.gov*

Innovative Technology Rulemaking Challenge

Next generation of new truck and bus technologies needed to meet air quality and climate goals

- Certification can be resource intensive for new technologies, but is critical for ensuring real, in-use emission reductions
- OBD can be particularly challenging for new, low-volume heavy-duty engine technology
 - Monitors all engine/aftertreatment components that may impact in-use emissions
 - Phased in for most heavy-duty engines in 2010-13

Innovative Technology Rulemaking Objectives

1. Provide certification flexibility to facilitate market launch of advanced truck and bus technologies needed to meet our air quality and climate goals; and
2. Maintain the ability to ensure these technologies' anticipated air quality benefits are achieved in-use



Today's ITR Public Workshop

1. 10:00 a.m. – 11:00 a.m.:
New Engine Certification Flexibility
2. 11:00 a.m. – 12:00 p.m.:
Hybrid Conversion System Certification
and Installation Procedures
→ *Draft Hybrid Emission Test Procedures to be reviewed at July 26, 2016 work group meeting*

DRAFT § 2208: Purpose, Applicability and Definitions

Section (b): Applicability

- ARB Certification Flexibility for Innovative New Heavy-Duty Engines (*optional*)
 - Engines meeting California's Optional Low-NOx Standard
 - Hybrids
 - Significantly more efficient engine technology
- Certification and Installation Procedures for Hybrid Conversion Systems for Motor Vehicles Over 6,000 lbs GVW (*mandatory*)

Innovative Technology Regulation

*DRAFT § 2208.1:
Certification Flexibility
for Innovative New Heavy-Duty Engines*

DRAFT § 2208.1(a): General Requirements

- 1) *Heavy-Duty Engine Certification Requirements:*
Must meet existing certification application, recordkeeping, and reporting requirements
- 2) *Surplus Emission Reductions:*
Must be surplus to the applicable new engine or vehicle standards
- 3) *Anti-Backsliding:* Must continue to meet OBD provisions with which engine/drivetrain is already compliant
- 4) *HD Hybrid Emission Testing (+ Chapter 7 of Handout #2)*

DRAFT § 2208.1(b): Low-NOx Heavy-Duty Engines

Model Year	2017	2018	2019	2020	2021	2022	2023	2024
Spark-Ignition: 0.05 or 0.02 g/bhp-hr NOx	Up to Three Consecutive MYs ITR per Manufacturer through 2021							
Compression-Ignition: 0.10, 0.05 or 0.02 g/bhp-hr NOx	Up to Three Consecutive MYs ITR per Manufacturer through 2024							

1) *Eligibility:* Up to three MY's eligibility per manufacturer through dates shown above

- (A) SI Engines: A manufacturer's three MYs of ITR eligibility begins in first MY any of its SI engines receives ITR certification flexibility, regardless of certification level
- (B) CI Engines: A manufacturer's three MY's of eligibility begins discretely for its 0.10, 0.05, and 0.02 g/bhp-hr engines

DRAFT § 2208.1(b)(2):

Potential Low-NOx Engine OBD Flexibility

(A) Use of assigned deterioration factors (DF)

(B) OBD System Requirements

1. *OBD System Demonstration:* Up to three ITR engine families do not trigger required OBD demonstration data set
2. *Production Engine Evaluation Testing:*
Fewer engines must be tested, more time to report
3. *Calculation of Fines for Deficiencies:*
Up to four allowable deficiencies exempt from fines
4. *Mandatory Recall for Emission Thresholds:*
Recall at 3x the applicable malfunction criteria

DRAFT § 2208.1(b)(3): Potential Multiple Low-NOx Engine Option

- (A) Manufacturer first utilizing ITR flexibility for two low-NOx engine families in same MY may deem one “early compliance”, the other “enhanced flexibility”
- (B) Both engines must be “surplus” for three MYs
- (C) Enhanced flexibility engine is exempt from threshold monitoring for first MY
- (D) Threshold monitoring flexibility option for SI engines through 2020 MY and CI engines through 2023 MY

DRAFT §2208.1(c): Hybrid Heavy-Duty Engines

Model Year	2017	2018	2019	2020	2021	2022	2023	2024
<35 Miles AER	Up to Two Consecutive MYs Tier 1 + Two Consecutive MYs Tier 2 per Manufacturer							
35+ Miles AER	Up to Four Consecutive MYs Tier 1 + Two Consecutive MYs Tier 2 per Manufacturer							

1) *Eligibility*

(A) and (B): Eligible MYs identified in above table

→ AER determined pursuant to Chapter 7 of Handout #2.

DRAFT §2208.1(c)(2):

Hybrid Heavy-Duty Engine Certification Flexibility

(A) Tier 1:

1. Use of assigned DFs
2. EMD+ in lieu of HD OBD
3. Engine labeling requirements

(B) Tier 2:

1. Use of assigned DFs
2. OBD flexibility similar to that for low-NOx engines

DRAFT §2208.1(c)(3): Dual Executive Order

1. Heavy-duty hybrids eligible for “Dual Executive Order” (dual EO) through 2020 MY
2. 2021-2024 MY dual EO eligibility contingent upon supplemental emission testing demonstrating no NOx, CO, or HC Increase
3. ARB to no longer issue dual EOs after 2024 MY
4. Eligibility for dual EO not contingent upon ITR participation
5. Engine shall be ineligible for dual EO if single entity is identified as responsible party on the engine’s US EPA Certificate of Conformity

DRAFT §2208.1(c)(4): Non-Traditional Heavy-Duty Hybrids

An engine originally certified for off-road, light- or medium-duty use may be deemed certified as a heavy-duty engine if it is:

1. installed in a vehicle achieving 35+ miles AER;
2. an electronically controlled engine;
3. incapable of directly propelling the vehicle;
4. newly manufactured and same MY as vehicle in which it is installed;
5. not a FEL engine;
6. equipped with a DPF, if diesel; and
7. installed in a vehicle certified pursuant to ARB's heavy-duty hybrid vehicle certification procedures
(Adopted December 2013)

DRAFT §2208.1(c)(4):

Non-Traditional Heavy-Duty Hybrids (cont.)

Potential HD Engine Certification Provisions

Engines would also have to meet the following requirements:

- Comply with HD useful life requirements
- Be warrantied for on-road HD use
- Meet HD OBD, with Tier 1 and Tier 2 flexibility afforded to hybrids with at least 35 miles AER
 - Tier 1: Maximum 100 per manufacturer per MY
 - Tier 2: Maximum 200 per manufacturer per MY
- Data collection and reporting requirements, to help inform certification after 2024 MY

DRAFT §2208.1(d): High-Efficiency Heavy-Duty Engine

1. *Eligibility and Certification Flexibility:* A heavy-duty engine that achieves at least a 15% CO₂ reduction relative to a 2017 MY engine eligible for same certification flexibility as hybrids with 35+ miles AER, through the 2027 MY
 - Engine must meet applicable CH₄ and N₂O standards
2. *Allowable Sales Volumes:*
 - Tier 1: 100 per manufacturer per MY
 - Tier 2: 200 per manufacturer per MY

DRAFT §2208.1(d): High-Efficiency Heavy-Duty Engine

ARB proposing to add the following CO₂ performance targets to CCR, title 13, §1956.8 as optional low-CO₂ standards to enable ITR implementation and enforcement

Draft Proposed Optional Low-CO₂ Compression-Ignition and Spark-Ignition Engine Emission Standards and Associated Benchmarks (in g/bhp-hr)*

	Spark-Ignition Engine	Compression-Ignition Engine				
	All-FTP*	LHD-FTP**	MHD-FTP**	HHD-FTP**	MHD-SET***	HHD-SET***
2017 Baseline Emissions	627	576	576	555	487	460
Proposed Phase 2 Standard in 2027 MY	627	553	553	533	466	441
Proposed Optional Low-CO₂ Emission Standards (15 percent below 2017 Baseline)	490	490	490	472	414	391
Percent Below Proposed Phase 2 GHG Standards (2027 MY)	-22%	-11%	-11%	-11%	-11%	-11%

* Draft potential Optional Low-CO₂ Emission Standards may change to reflect changes in Final Federal Phase 2 GHG Standards (anticipated this Summer).

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*Potential Certification Flexibility
for Innovative New Heavy-Duty Engines*

DISCUSSION

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*DRAFT Certification and Installation Procedures
for Hybrid Conversion Systems
for Motor Vehicles Over 6,000 lbs. GVW*

Handout #2

ITR Hybrid Conversion System Certification

DRAFT Section 1: Applicability

ARB certification of an aftermarket system that converts any of the following base engines or vehicles to operate as a hybrid:

- a) A 2007 and subsequent MY California-certified 6,001 to 8,500 lbs GVW base vehicle, where the conversion achieves at least 35 miles AER
- b) A 2007 and subsequent MY California-certified 8,501 to 14,000 lbs GVW base vehicle
- c) A 2010 and subsequent MY California-certified base engine installed in a vehicle over 14,000 lbs

ITR Hybrid Conversion System Certification

DRAFT Section 3: General Requirements

- a) Emission Performance Criteria
- b) Emission Control Labels
- c) Drivability
- d) Anti-Backsliding
- e) Owner's Manual
- f) Installation
- g) Funding Program Disclosure Requirements
- h) Battery Disposal

ITR Hybrid Conversion System Certification Overview: DRAFT Regulatory Structure

Calendar Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Conversion System Achieves <35 Miles AER	Tier 1 (10 units/manufacture) → Tier 2 (500 units/manufacture) → Tier 3/Final						Tier 3/Final Only (no volume limit)				
Conversion System Achieves 35+ Miles AER	Tier 1 (25 units/manufacture) → Tier 2 (1,000 units/manufacture) → Tier 3/Final										

- Manufacturer may meet progressively more stringent Tier 1 → Tier 2 → Tier 3 OBD, warranty and other ARB certification requirements
- Tiers 1 and 2 sunset on January 1 of 2022 or 2025, as shown above, after which hybrid conversions may certify to Tier 3 only

ITR Hybrid Conversion System Certification

DRAFT Section 4: Tier 1

- a) *Emission Compliance*
- b) *Conversion with <35 miles AER: Allows CA sales/ installation of up to 10 units per manufacturer*
 - 1) Systems eligible for Tier 1 cert. through January 1, 2022
 - 2) Systems may be sold/installed through January 1, 2027
- c) *Conversion with 35+ miles AER: Allows CA sales/ installation of up to 25 units per manufacturer*
 - 1) Systems eligible for Tier 1 cert. through January 1, 2025
 - 2) Systems may be sold/installed through January 1, 2030
- d) Report to ARB regarding Tier 1 certified units

ITR Hybrid Conversion System Certification

DRAFT Section 4: Tier 1

(e) Tier 1 OBD Requirements

- 1) Monitoring Requirements
- 2) Hybrid System Diagnostic Link Connector
- 3) Monitoring Conditions
- 4) Base Engine, OBD System or Aftertreatment System Modifications
- 5) Production Engine/Vehicle Evaluation Testing
Verification of Standardized Requirements

ITR Hybrid Conversion System Certification

DRAFT Section 5: Tier 2

- a) *Emission Compliance*
- b) *Conversion with <35 miles AER: Allows CA sales/ installation of up to 500 units per manufacturer*
 - 1) Systems eligible for Tier 2 cert. through January 1, 2022
 - 2) Tier 2 systems may be sold/installed through January 1, 2027
- c) *Conversion with 35+ miles AER: Allows CA sales/ installation of up to 1,000 units per manufacturer*
 - 1) Systems eligible for Tier 2 cert. through January 1, 2025
 - 2) Tier 2 systems may be sold/installed through January 1, 2030
- d) Not required to first certify to Tier 1

ITR Hybrid Conversion System Certification

DRAFT Section 5: Tier 2 (cont.)

- (e) Report to ARB regarding Tier 1 and Tier 2 certified units, if applicable
- (f) Meet Tier 1 OBD requirements, plus:
 - 1) Monitoring Conditions
 - 2) OBD System Readiness Status Demonstration
 - 3) Modification's to Base Engine's OBD System
 - 4) Monitoring System Demonstration Requirements
 - 5) Production Engine or Vehicle Evaluation Testing
- (g) Tier 3 OBD System Compliance Plan

ITR Hybrid Conversion System Certification

DRAFT Section 6: Tier 3/Final Certification

- a) Emission Compliance
- b) No California sales volume limit or sunset date
- c) Not required to first certify to Tier 1 or Tier 2
- d) Report to ARB regarding Tier 1 and Tier 2 certified units, if applicable

ITR Hybrid Conversion System Certification

DRAFT Section 6: Tier 3/Final Certification

Meet Tier 2 OBD requirements, plus:

- 1) Monitoring Requirements
- 2) Monitoring Conditions
- 3) Hybrid System Diagnostic Link Connector
- 4) OBD System Modifications
- 5) Monitoring System Demonstration Requirements
- 6) Production Engine or Vehicle Evaluation Testing

ITR Hybrid Conversion System Certification

DRAFT Section 7: Emission Test Procedures

*To be reviewed with interested stakeholders at
July 26, 2016 Public Work Group Meeting*

Teleconference Information

Date: July 26, 2016

Time: 10 a.m. – 12:00 p.m. PDT

Tel. 800-369-1908

Passcode: 63918

ITR Hybrid Conversion System Certification

DRAFT Section 8: Request for Certification

- a) Overview
- b) Application information, including:
 - (11) Manufacturer's criteria for authorizing installers;
 - (15) Description of OBD system modifications;
 - (16) Proposed emission test plan;
 - (17) Copy of supplemental labels;
 - (19) Compliance statement
- c) ARB may require a market-ready conversion system or converted vehicle be provided

ITR Hybrid Conversion System Certification

DRAFT Section 9: Hybrid Conversion System Approval

a) Issuance of Executive Orders:

- 1) $\geq 20\%$ GHG benefit to be identified on Executive Order
- 2) Emission benefit may not be used for emissions compliance

b) Carry-Over and Carry-Across:

Process for emissions data from a previous MY (i.e., carry-over data) or from similar base engines or vehicles (i.e., carry-across data) to be applied in lieu of potentially duplicative emission testing

ITR Hybrid Conversion System Certification

DRAFT Section 10: Minimum Warranty Requirements

a) Product Warranty

Table 1: Minimum Manufacturer Warranty Periods

Conversion System Approval Level	Hybrid conversion system minimum warranty period
Tier 1	3 years or 50,000 miles, whichever comes first ¹
Tier 2	5 years or 60,000 miles, whichever comes first ¹
Tier 3	7 years or 70,000 miles, whichever comes first ²

1 – Hybrid conversion systems with ePTO may include a 3,000 hour warranty period in lieu of a minimum mileage.

2 – Hybrid conversion systems with ePTO may include a 4,200 hour warranty period in lieu of a minimum mileage.

ITR Hybrid Conversion System Certification

DRAFT Section 10: Minimum Warranty Requirements

(cont.)

- b) Minimum Installation Warranty:
3 years or 50,000 miles
- c) Product Warranty Statement
- d) Warranty Notification
- e) Installation Warranty Statement
- f) Warranty Report

ITR Hybrid Conversion System Certification

DRAFT Section 11: Recall Provisions

The Executive Officer may require a recall plan and a conversion system recall if:

- Potential for catastrophic or safety-related failure
- Valid warranty claims exceed 4% or 25 units, whichever is greater
- Failure of an operational feature

Recalls would follow provisions of Title 13, CCR sections 2112 through 2121.

DRAFT Proposed Innovative Technology Regulation Next Steps

- Hybrid Technology Emission Test Procedures
Public Work Group July 26, 2016
- Proposed ITR published for public comment on
September 2, 2016
- Board consideration anticipated
on October 20, 2016 (Fresno, CA)
 - Should ARB request an early effective date, so
implementation could begin in early 2017?

DRAFT Proposed Innovative Technology Regulation

Key ARB Contacts

Joe Calavita, Staff Lead
Tel. 916-445-4586
jcalavit@arb.ca.gov

Jason Wong, OBD Lead
Tel. 626-575-6838
jason.wong@arb.ca.gov

David Chen, Manager
Tel. 626-350-6579
david.chen@arb.ca.gov

Webpage: www.arb.ca.gov/msprog/itr/itr.htm

List Serve: www.arb.ca.gov/listserv/listserv_ind.php?listname=itr

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