

Rail Emission Reduction Agreements

CARB emission reduction agreements with the Class 1 Railroads

CATEGORIES

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Freight Technology Advancement Branch

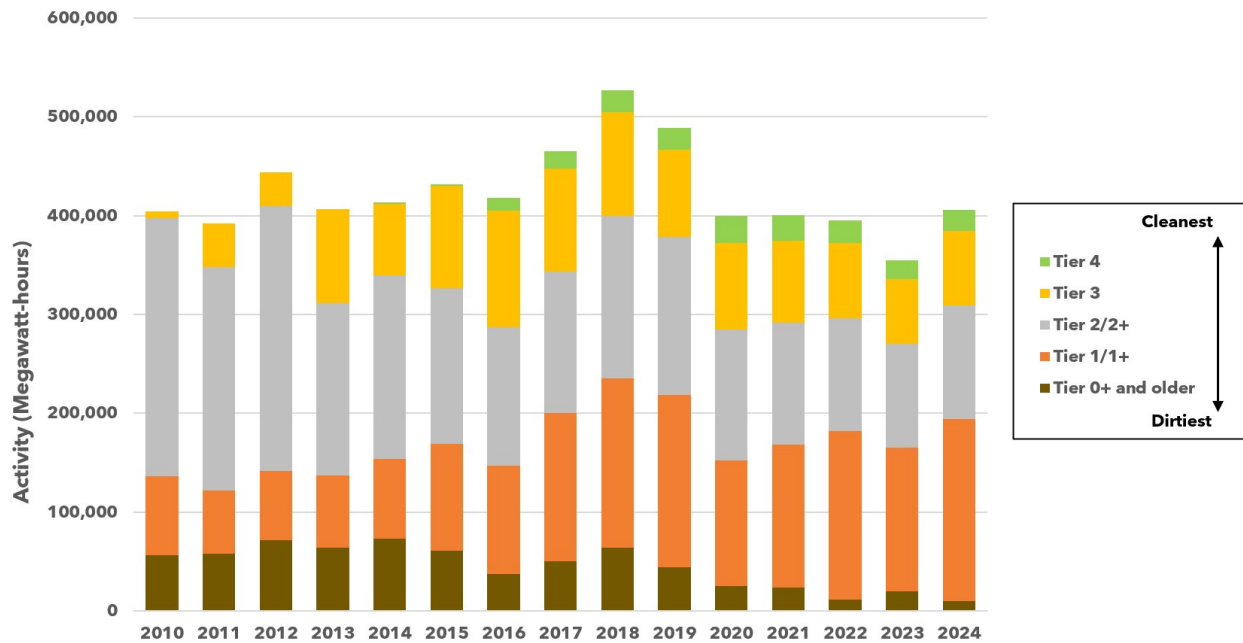
Email freight@arb.ca.gov

1998 Locomotive NO_x Fleet Average Emissions Agreement in the South Coast Air Basin (1998 MOU)

The 1998 Locomotive NO_x Fleet Average Emissions Agreement in the South Coast Air Basin (1998 MOU), signed by CARB, Union Pacific Railroad (UP) and BNSF Railway (BNSF), aims to decrease the use of old and dirty diesel locomotives in the South Coast Air Basin. Under the Agreement, UP and BNSF agreed to operate locomotive fleets that “on average” meet a Tier 2 NO_x emission standard, or 5.5 g/bhp-hr by 2010 (and through 2030). The Agreement provides State Implementation Plan (SIP) creditable emission reductions.

2024 Fleet Activity Data for the South Coast Air Basin

The graph below illustrates locomotive activity aggregated by engine tier that has operated in the South Coast Air Basin (SCAB) from 2010 - 2024 using data from UP and BNSF reported to CARB under the 1998 MOU.



1. For more details, refer to the MOU summaries in the Archive of 1998 MOU Data below or contact us at locomotives@arb.ca.gov.
2. For more information on the U.S. EPA locomotive emission standards please visit [Document Display | NEPIS | US EPA](#).

Union Pacific Railroad

Tier ¹	Number of Locomotives ²	Megawatt-Hours (MWh)	% MWh by Tier	Weighted Average NOx Emission Level (g/bhp-hr) ³	Tier Contribution to Fleet Average (g/bhp-hr) ⁴
Pre_Tier_0	11	73	0.0%	9.1	0.00
Tier 0	251	5,286	2.6%	8.0	0.2

Tier 1	1,909	102,502	51.3%	6.7	3.5
Tier 2	1,215	52,412	26.2%	4.8	1.3
Tier 3	805	29,406	14.7%	4.9	0.7
Tier 4	230	10,188	5.1 %	1.1	0.1
Total	4,421	199,868	100%		5.7
				ULEL credits used	0.2
				Fleet Average	5.5

1. For more information on the U.S. EPA locomotive emission standards please visit [Document Display | NEPIS | US EPA](#).
2. Number of locomotives is the sum of all individual locomotives that visited or operated within the South Coast Air Basin at any time during 2024.
3. Many locomotives are certified to emission levels cleaner than the U.S. EPA emission standards or tiers. For the purposes of this table, a locomotive’s actual certified emission level is grouped with the required tier level. Within each tier, the Weighted Average NOx Emission Level is calculated by multiplying each individual locomotive's actual certification level by its megawatt-hours of operation.
4. The Tier Contribution is calculated by multiplying the %MWh by Tier Level by the Weighted Average NOx Emission Level.

BNSF Railway

Tier¹	Number of Locomotives²	Megawatt-Hours (MWhrs)	% MWhrs by Tier Level	Weighted Average NOx Emission Level (g/bhp-hr)³	Tier Contribution to Fleet Average (g/bhp-hr)⁴
Pre_Tier_0	498	553	0.3%	13.0	0.03
Tier 0	94	4,067	2.0%	11.2	0.2
Tier 1	1,527	81,754	39.7%	6.5	2.6
Tier 2	1,663	62,681	30.4%	4.9	1.5
Tier 3	1,269	46,001	22.3%	4.6	1.0
Tier 4	281	10,984	5.3%	1.2	0.1
Total	5,332	206,040	100%		5.4

1. For more information on the U.S. EPA locomotive emission standards please visit Document Display | NEPIS | US EPA.

2. Number of locomotives is the sum of all individual locomotives that visited or operated within the South Coast Air Basin at any time during 2024.

3. Many locomotives are certified to emission levels cleaner than the U.S. EPA emission standards or tiers. For the purposes of this table, a locomotive's actual certified emission level is grouped with the required tier level. Within each tier, the Weighted Average NOx Emission Level is calculated by multiplying each individual locomotive's actual certification level by its megawatt-hours of operation.

4. The Tier Contribution is calculated by multiplying the %MWh by Tier Level by the Weighted Average NOx Emission Level.

2024 Compliance Report and Data Summaries

- UPRR Approval Letter for 2024
- UPRR Compliance Report
- UPRR Locomotive Summary
- BNSF Approval Letter for 2024
- BNSF Compliance Report
- BNSF Locomotive Summary

Archive of 1998 MOU Data

- Data from 2010-2023

Previously Completed: The 2005 Statewide Railyard Agreement

The 2005 Statewide Railyard Agreement, which was completed in 2015, included a statewide idle reduction program, maximized the use of state and federal ultra-low sulfur (15 parts per million maximum) diesel fuel, and established a statewide visible emissions reduction and repair program. The agreement also required the preparation of 17 railyard inventories and health risk assessments.

- 2005 Statewide Railyard Agreement
- Railyard Health Risk Assessments and Mitigation Measures

DOCUMENTS

1998 Railroad MOU
1998MOU.PDF · 963 KB

RELATED RESOURCES

**Mobile Source
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**2025 Mobile Source
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**January 12, 2022
Public Webinar
Transcript**

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