



Fact Sheet

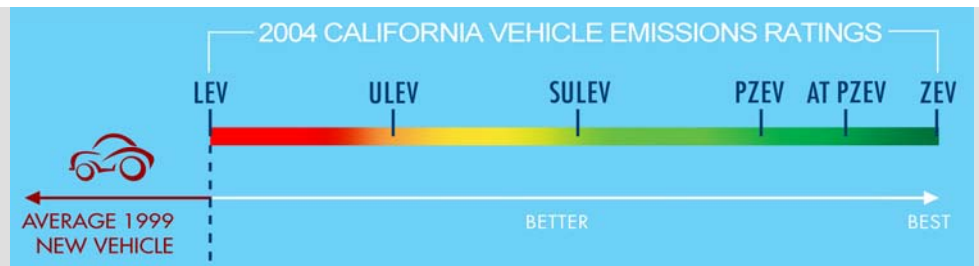
California Environmental Protection Agency

Air Resources Board

California Vehicle Emissions

A vehicle's emissions are the result of the combined attributes of fuel type, controls on the engine's operations, and maintenance throughout the life of the vehicle. All new vehicles sold in California must be certified to one of six California Air Resources Board (ARB) emissions ratings; however, the criteria to meet these ratings vary depending upon the weight of the vehicle. For example, heavier vehicles like trucks and SUVs, have less stringent criteria than smaller vehicles to receive the same emissions rating. This will phase out by 2008, when SUV size vehicles must match the more stringent criteria currently required for smaller cars. A vehicle's emissions rating is posted on the Vehicle Emissions Control Information Label found under the hood.

California's emissions ratings apply to all new vehicles sold in this state, and are the most stringent in the world.



LEV (Low Emission Vehicle): The least stringent emission standard for all new cars sold in California beyond 2004.

ULEV (Ultra Low Emission Vehicle): 50% cleaner than the average new 2003 model year vehicle.

SULEV (Super Ultra Low Emission Vehicle): 90% cleaner than the average new 2003 model year vehicle.

PZEV (Partial Zero Emission Vehicle): Meets SULEV tailpipe standards, has a 15-year / 150,000 mile warranty, and zero evaporative emissions¹.

AT PZEV (Advanced Technology PZEV): Meets PZEV standards and includes ZEV enabling technology.

ZEV (Zero Emission Vehicle): Zero tailpipe emissions, and 98% cleaner than the average new 2003 model year vehicle.

How Technologies Compare in Emissions

Gasoline Powered Vehicles: Gasoline powered vehicles have historically been considered very polluting, however, recent model years have achieved very stringent emissions standards. In 2004, 37 gas-powered vehicle models were certified to PZEV standards, and this number is expected to increase greatly in coming years. Gas-powered vehicles are able to achieve stringent standards because of advanced controls on engines and fuel systems that substantially reduce tailpipe emissions and virtually eliminate evaporative emissions.

Hybrid-Electric Cars: Hybrid vehicles will always produce fewer greenhouse gas emissions than a comparable pure gasoline powered vehicle. The overall emissions, however, will vary depending on the vehicle's "level of hybrid" (electrical storage capacity), and how advanced the engine

¹Evaporative emissions are fuel vapors that escape to the outside

controls are. Each hybrid model must be judged individually, and may or may not have fewer smog-forming emissions than a gas-powered car.

Alternative Fueled Vehicles (AFVs): AFVs can operate on fuel other than gasoline or petroleum based diesel, such as electricity, ethanol, hydrogen (H₂), methanol, natural gas (CNG), biologically produced diesel (biodiesel), or propane (LPG). Alternative fuels are generally cleaner than gasoline, but adequate controls on the engine are necessary to ensure fewer overall emissions.

- **Flex-fuel** – A flexible fueled vehicle has a single fuel tank, fuel system, and engine. The vehicle is designed to run on unleaded gasoline and an alcohol fuel (usually ethanol) in any mixture. These engines have sensors to analyze the fuel mixture, and adjust the fuel injection and timing. Since fuel composition and engine controls vary widely from one car to the next, flex-fuel vehicles do not assure fewer emissions than dedicated gas-powered vehicles.
- **Bi-fuel** – A bi-fuel vehicle has two separate fuel systems, one for gasoline or diesel and another for LPG, CNG or H₂. Because LPG, CNG and H₂ are stored in pressurized tanks, they cannot be simply pumped into the gasoline tank. Like flex-fuel vehicles, bi-fuel vehicle emissions vary from car to car depending on engine controls and the fuel chosen – making them not necessarily cleaner than a dedicated gas vehicle.

Hydrogen Fuel Cell Vehicle (FCVs): All H₂ FCVs are zero emission. Currently, most H₂ is harvested from natural gas – the cleanest and most efficient method at this time. The source of H₂ is an integral part of the emissions considerations, but H₂ FCVs themselves are zero emission. Not all FCVs are zero emission, for example, if they use methanol such as in a direct methanol FCV, they produce some carbon monoxide emissions and potential other trace constituents.

Diesel: Vehicles run on diesel achieve better fuel economy and contribute less to greenhouse gas emissions. And although emissions from diesel vehicles are better controlled because of improved engines, new emission control devices and reduced sulfur content in the fuel, diesel vehicles still have significant particulate and oxides of nitrogen emissions. Diesels have met only federal Tier I standards to date, which are about 4.5 times dirtier than California’s least stringent LEV standard.

Common Terms

AER	All Electric Range	GHG	Greenhouse Gas	NOx	Oxides of Nitrogen
AFV	Alternative Fuel Vehicles	H₂	Hydrogen	OBD	On Board Diagnostics
AT PZEV	Advanced Technology Partial Zero Emission Vehicle	HC	Hydrocarbon	PbA	Lead Acid (battery)
BEV or EV	Battery Electric Vehicle	HEV	Hybrid Electric Vehicle	PC	Passenger Car
CaFCP	California Fuel Cell Partnership	HEV 20	Hybrid EV with 20 Miles All Electric Range	PEM	Proton Exchange Membrane (fuel cell)
CBG	Cleaner Burning Gasoline	LDT	Light Duty Truck	PPM	Parts Per Million
CEV	City Electric Vehicle	LEV	Low Emission Vehicle	PZEV	Partial Zero Emission Vehicle
CNG	Compressed Natural Gas	LEV II	1998 amendments to LEV program	SULEV	Super Ultra Low Emission Vehicle
CO₂	Carbon Dioxide	LPG	Liquid Petroleum Gas (Propane)	ULEV	Ultra Low Emission Vehicle
E85	85% Ethanol (gas blend)	MDV	Medium Duty Vehicle	UDDS	Urban Dynamometer Driving Schedule
FCEV or FCV	Fuel Cell Electric Vehicle	MeOH	Methanol	VMT	Vehicle Miles Traveled
FE	Fuel Efficiency	NEV	Neighborhood Electric Vehicle	ZEM	Zero Emission Motorcycle
FFEV	Full Function Electric Vehicle	NiMH	Nickel Metal Hydride (battery)	ZEB	Zero Emission Bus
g/mile	Grams per Mile	NMOG	Non Methane Organic Gas	ZEV	Zero Emission Vehicle