2017 Clean Car Buying Guide

South Coast AQMD

SCAQMD

Cleaning the air that we breathe...

ADVISOR

Lower Prices Means Good News for Green Car Buyers

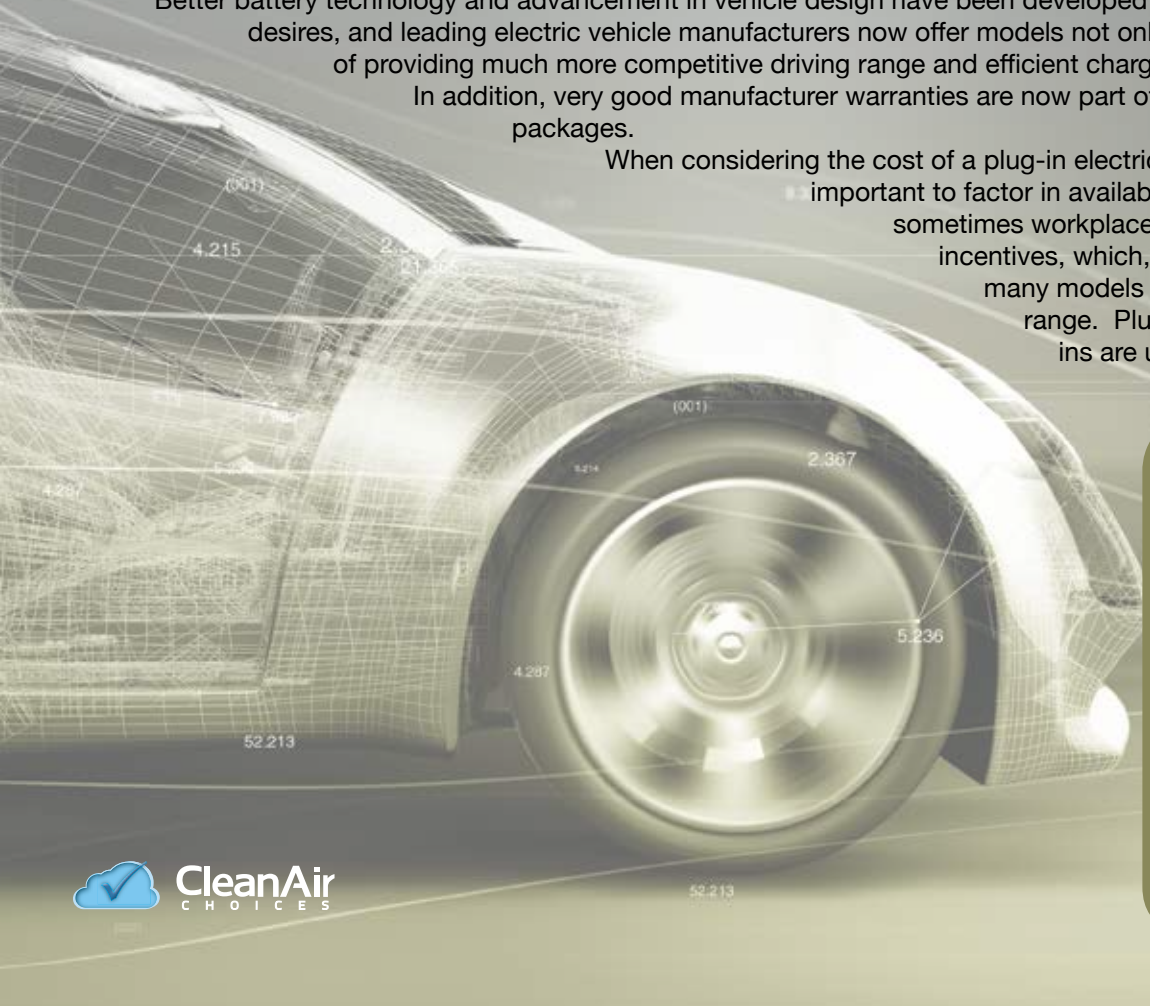
Recent trends in hybrid and all-electric transportation technologies bring good news for buyers looking for an alternative to gasoline-powered vehicles. The price tags on greener vehicles have started to go down, and in some cases, plummet, making the switch from gas to electric much more affordable.

For consumers, the prospect of upgrading to a hybrid or all-electric engine during the last decade could mean limited passenger space or driving distance, or paying for equipment to prolong your car's charge and maximize its range. Consequently, the adoption of greener vehicle technology got off to a slow start. Electric cars could be prohibitively expensive for buyers on a budget.

Better battery technology and advancement in vehicle design have been developed in response to consumer desires, and leading electric vehicle manufacturers now offer models not only at a lower price, but capable of providing much more competitive driving range and efficient charging capability.

In addition, very good manufacturer warranties are now part of most electric vehicle packages.

When considering the cost of a plug-in electric vehicle, for example, it's important to factor in available rebates, tax credits, and sometimes workplace and commercial charging incentives, which, when combined, can bring many models to a very competitive price range. Plus, the operating costs of plug-ins are usually lower as well.



According to The Wall Street Journal, a lithium-ion battery for the original Nissan Leaf in 2010 cost nearly $18,000, or approximately $750 per kilowatt hour (kWh), whereas the 2017 battery for the all-electric Chevy Bolt costs $145 per kWh, and is estimated to drop to $100 per kWh by 2021, according to *HybridCars.com*.

CleanAir CHOICES

Are Alternative Fuel Vehicles Safer Than Conventional Cars?

With electricity and hydrogen now powering a growing number of vehicles on our roadways, some wonder whether these cars are as safe as conventional gasoline-powered vehicles.

All-electric and hydrogen fuel cell vehicles must meet the same safety standards as gasoline and diesel-powered vehicles. Crash tests are required to assure that all vehicles meet the standards developed by the National Highway Transportation Safety Administration (NHTSA) which assure a vehicle's structural integrity and how well it protects passengers in a collision.

Many alternative fuel vehicles not only meet these standards, but exceed them. For instance, when NHTSA tested the Tesla Model S in 2013 it declared that it was one of the safest vehicles it has ever tested.

While some are concerned about lithium-ion car batteries will catch fire as has occurred with some phone and laptop batteries, electric vehicles include extra precautions to assure this possibility is extremely remote. EV manufacturers typically protect the battery by locating it in the center of the vehicle under the floor, including an air or liquid cooling system to prevent the battery's electrodes from overheating, and adding an extra protective covering to the battery pack, such as Tesla's quarter-inch thick aluminum plate covering its batteries.

While there have been some EV battery fires caused by collisions damaging the cars' battery packs, many more fires have occurred in gasoline vehicles when their gas tanks are ruptured.

For hydrogen fuel cell vehicles there have also been concerns expressed about the threat of fires or explosions. But the design of the fuel devices separates the fuel cell stack from the battery pack, and then encases each separately in metal and is then insulated, providing protections that minimize the risk of a problem. Fuel cell vehicles include other safeguards as well, such as extra-strong fuel tanks and high-voltage circuits that are color coded. And in the case of the Hyundai Tucson Fuel Cell Electric Vehicle, crash sensors and pressure release devices on the vehicle can safely release hydrogen in a controlled manner to avoid an explosion.

In fact, with more than one thousand fuel cell vehicles on the road, a few have already been involved in collisions, but as a result of the safety features, there has been no major damage.

In the end, carmakers, as well as federal safety experts, have worked to make sure that their alternative fuel vehicles pose no significant safety risk, and are as safe, or safer, than equivalent gasoline-powered vehicles.

About This 2017 Clean Car Guide

When people decide they want to search for a new car, they consider many different options. And more and more people are considering a cleaner fueled vehicle. Whether it is an electric vehicle, a car powered by a hydrogen fuel cell, or a hybrid, there are a growing number of vehicles to choose from. This Special Edition of the SCAQMD Advisor seeks to help consumers better understand the array of choices available so they can choose the car that is best for them.

Each of the vehicles in this guide are different, but they all have a few things in common: they all help drivers do their part to help clean the air, and they all help reduce their carbon footprint. Many provide other benefits to drivers seeking to do more than just get from point A to point B. Some will get drivers to their destinations sooner, like many of the vehicles on this list that qualify for carpool stickers allowing solo drivers access to HOV lanes. Some will get drivers there cheaper, by lessening the number of trips to the pump, saving time and money. Still others, with their futuristic designs, will get drivers to their destination in style.

The South Coast Air Quality Management District is pleased to provide this publication to help drivers make a more informed decision about purchasing an alternative fuel vehicle, lowering their carbon footprint, and helping each person do their part to clean the air that we breathe.

Visit SCAQMD's Clean Air Choices website at *aqmd.gov/cleanairchoices/* to find more information on specific models.

SUBCOMPACT

Type of Vehicle	Make	Models	MPGe City/Hwy*	Carbon Footprint (C02 tons/yr)**	MSRP($)	Passengers	Range (miles)	220/240V Charging Time (Hours)
Battery Electric Vehicle (BEV)	BMW	i3 BEV (94AH)	129/106	0.00	$43,600	4	114 mi battery-only	5hrs at 220V
Battery Electric Vehicle (BEV)	BMW	i3 BEV (60AH)	137/111	0.00	$42,400	4	80 mi battery-only	3hrs at 220V
Plug-In Hybrid (gasoline/ electric)	BMW	i3 REX (94Ah, Plug-In hybrid gasoline-electric	35 (gasoline) 111 (electric)	0.4	$47,450	4	97 mi battery, 180 mi total	5hrs at 240V
Battery Electric Vehicle (BEV)	Chevrolet	Bolt	129/106	0.00	$33,220	4/5	238 miles	4.5hrs at 220V
Battery Electric Vehicle (BEV)	Fiat	500e	129/106	0.00	$31,800	2/5	87 mi battery-only	4hrs at 220V
Battery Electric Vehicle (BEV)	Mitsubishi	i-MiEV	129/106	0.00	$23,845	4	59 mi battery only	6hrs at 220/240V

NOTES

* MPGe: Miles per gallon gasoline equivalent (MPGe) is a measure of the average distance traveled per unit of energy consumed. Based on EPA formula of 33.7 kW/hour equal to one gallon of gasoline energy. Approximate MPG or MPGe based on 2017 model year data.

** Tailpipe Carbon Footprint information based on vehicle driven 15,000 miles per year. Information from *fueleconomy.gov*. For more information, see CARB's website at *arb.ca.gov/msprog/onroad/cert/cert.php*

Tax Credits – The federal tax credit for qualified plug-in electric vehicles is between $2,500 and $7,500 depending on the vehicle's battery capacity. (see *afdc.energy.gov/laws/409 for details*). The California state tax credit varies depending on the vehicle type and the household income of the purchaser (see *cleanvehiclerebate.org* for details). Visit *afdc.energy.gov/laws* for more info.

MSRP - Manufacturer's Suggested Retail Price, which generally excludes tax, title, license, dealer fees, destination freight charge and optional equipment.

Visit SCAQMD's website at *aqmd.gov and cleanairchoices.org* for its Clean Air Choices site.

Chevrolet Bolt

Mitsubishi i-MiEV

COMPACT

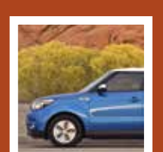
Type of Vehicle	Make	Models	MPGe City/Hwy*	Carbon Footprint (C02 tons/yr)**	MSRP($)	Passengers	Range (miles)	220/240V Charging Time (Hours)
Plug-In Hybrid (gasoline/ electric)	Audi	Audi A3 E-TRON (Plug-In hybrid gasoline-electric)	34 (gas) 83 (electric)	2.4	$38,900	5	16 miles battery, 380 total	2.15h at 220V
Plug-In Hybrid (gasoline/ electric)	Chevrolet	Volt (Plug-In hybrid gasoline-electric)	42 (gas) 106 (electric)	0.8	$33,220-37,570	5	53 miles battery, 420 mi total	4.5h @ 240v
Plug-In Hybrid (gasoline/ electric)	Ford	C-MAX Energy (Plug-In hybrid gasoline-electric)	39 (gas) 95 (electric)	1.8	$24,120	5	20 miles battery, 570 mi total	2.5 hrs at 240v
Hybrid	Ford	C-Max Hybrid FWD	42/38	3.3	$24,995	5	NA	NA (gasoline)
Battery Electric Vehicle (BEV)	Ford	Focus FWD BEV	118/96	0.00	$29,120	4.5/5	100 miles battery-only	3.5 h charge time @ 220/240V
Battery Electric Vehicle (BEV)	Kia	Soul Electric	120/92	0.00	$31,950	5	93 miles	5h at 220V

COMPACT SUV

Type of Vehicle	Make	Models	MPGe City/Hwy*	Carbon Footprint (C02 tons/yr)**	MSRP($)	Passengers	Range (miles)	240V Charging Time (Hours)
Fuel Cell	Hyundai	Tucson Fuel Cell	48/51	0.00	$50,875 (Lease Only)	5	265 miles	NA (hydrogen)

Ford Focus

Chevrolet Volt



Kia Soul

Nissan Leaf

MIDSIZE

Type of Vehicle	Make	Models	MPGe City/Hwy*	Carbon Footprint (C02 tons/yr)**	MSRP($)	Passengers	Range (miles)	240V Charging Time (Hours)
Plug-In Hybrid (gasoline/ electric)	Ford	Fussion Energi (Plug-In hybrid gasoline-electric)	42 (gas) 97 (electric)	1.7	$28,115-$33,270	5	22miles battery, 610 total	2.5 hrs
Hybrid	Ford	Fusion Hybrid FWD	22/31	3.2	$28,115 - $33,270	5	NA	NA (gasoline)
Hybrid	Honda	Accord Hybrid	49/47	2.7	$29,605 - $35,955	5	NA	NA (gasoline)
Fuel Cell	Honda	Clarity Fuel Cell	68/66	0.00	$60,000 (Lease Only)	5	366 miles	N/A (hydrogen)
Plug-In Hybrid (gasoline/ electric)	Hyundai	Sonata Plug-In Hybrid 2.0L (Plug-In hybrid gasoline-electric)	39 (gas) 99 (electric)	1.6	$26,000	5	27miles battery, 590 total	2.7hrs
Plug-In Hybrid (gasoline/ electric)	Kia	Optima Plug-In Hybrid 2.0L (Plug-In hybrid gasoline-electric)	40 (gas) 103 (electric)	1.5	$23,050	5	29miles battery, 610 total	2.7 hrs
Hybrid	Lincoln	MKZ Hybrid FWD	18/27	3.3	$34.755	5	NA	NA (gasoline)
Battery Electric Vehicle (BEV)	Mercedes-Benz	B250e Electric Drive	85/82	0.00	$39,900	5	87 miles	3hrs with 240V
Battery Electric Vehicle (BEV)	Nissan	Leaf (30kw-hr battery pack)	124/101	0.00	$34,200	5	107miles	6hrs at 220v, 7hrs from empty 240v
Hybrid	Toyota	Camry Hybrid LE, Camery 2.5 L XLE (hybrid gasoline-electric)	42/38	3.4	$26,790	5	NA	NA (gasoline)
Fuel Cell	Toyota	Mirai	66/66	0.00	$58,365	4	312 miles	N/A (hydrogen)
Hybrid	Toyota	Prius (1.8) (hybrid gasoline-electric)	54/50	2.6	$24,685 - $30,015	5	NA	NA (gasoline)
Hybrid	Toyota	Prius Eco (1.8) (hybrid gasoline-electric)	58/53	2.4	$25,165	5	NA	NA (gasoline)
Plug-In Hybrid (gasoline/ electric)	Toyota	Prius Prime (Plug-In hybrid gasoline-electric)	54 (gas) 133 (electric)	0.00	$28,800	4	28miles battery, 640 total	2hrs

FULL SIZE

Type of Vehicle	Make	Models	MPGe City/Hwy*	Carbon Footprint (C02 tons/yr)**	MSRP($)	Passengers	Range (miles)	220/240V Charging Time Hours
Battery Electric Vehicle (BEV)	Tesla	Model S 60 kWh, Model S 75 kWh	98/101	0.00	$69,900	5	210miles	10hrs at 220v, 8.5hrs at 220v, 8.67hrs at 220v, 1..25hr at 440v, 8.67hs at 220v
Battery Electric Vehicle (BEV)	Tesla	Model S 60D, Model S 75D, Model S 90D, Model S P90D, Model S P100D	101/107 92/103	0.00	$71,000-$79,500-$88,000-$180,000-$134,500	5/7	60D-253miles, 75D-259miles, 90D-294miles, P90D-270miles, 315 miles battery only	10hrs at 220v, 8.5hrs at 220v, 8.67hrs at 220v, 1.25hrs at 440v, 8.67hrs at 220v, 10.72hrs at 220v
Plug-In Hybrid (gasoline/ electric)	Mercedes-Benz	S 550E (3.0L) (Plug-In hybrid gasoline-electric)	26 (gasoline) 14 (electric)	3.4	$96,600	5	450 miles total	1.9hrs at 240v

FULL SIZE SUV

Type of Vehicle	Make	Models	MPGe City/Hwy*	Carbon Footprint (C02 tons/yr)**	MSRP($)	Passengers	Range (miles)	240V Charging Time Hours
Battery Electric Vehicle (BEV)	Tesla	Model X 60D, Model X 75D, Model X90D, Model X P90D, Model X P100D	91/95 81-90/92	0.00	$74,000-$85,500-$95,500-$115,500-$135,500	7	60D-200 miles battery-only 60D-200 miles battery-only 60D-200 miles battery-only 60D-200 miles battery-only 60D-200 miles battery-only	6.58hrs at 220v, 7.75hrs at 220v, 8.25hrs at 220v, 8.25hrs at 220v, 95hrs at 220v

Battery Technology Charges Forward

People today find it hard to imagine the weight, short charge life span and charging rituals that bulky batteries of the past required and the lengths that people went through to be 'connected' not that many years ago.

For instance, when cell phones were introduced in the 1980s, people had to carry a back pack or small suitcase that held the big heavy battery needed to power the huge handset. And when laptops were in their infancy, the batteries were the size of a phone book.

Over the past three decades, improvements in battery technology have not only facilitated phones and laptops becoming thinner and lighter, but have also enabled them to last longer on a charge. These improvements have also helped power a new generation of electric vehicles (EVs).

Today, battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) have stronger power output, lighter weights, faster charging speeds and smarter battery controls to power the new vehicles being delivered to Southland auto dealerships in 2017. Improvements in modern battery technology allow more energy to be packed into smaller spaces and more than double the driving range of models from past years, and the new and improved versions will also last significantly longer.

Batteries have moved from lead acid for the first EVs, to nickel-metal hydride (NiMH) and nickel cadmium (NiCd) in the first generation of hybrid and electric cars, to a wide array of lithium-ion powered versions on the road today. The next generation of batteries will be even more advanced with experts anticipating batteries using sodium, aluminum, cobalt, zinc and even air. Amazing compounds are being created, tried and tested to ensure that the batteries powering cars in five years will be quicker to power-up and last longer on each charge than those used in cars today.

Inland Empire is Home to the "Gas Station of The Future"

The Inland Empire, home to the first McDonald's and Taco Bell, is also home to "the gas station of the future", the first conventional gas station to also offer every alternative fuel in the market.

Need a charge on your electric Nissan Leaf ? Does your Honda Clarity need a full tank of hydrogen before going to Las Vegas? Just pull off the I-10 freeway in the City of Ontario to meet any of your fuel needs. On the corner of Holt and Vineyard you will find Ontario CNG Station, Inc. a unique station offering multiple types of fuel for vehicles. In addition to offering all traditional grades of gasoline there is also hydrogen, biodiesel, biofuel, slow and fast chargers, and CNG.

The State of California projects there will be 165,000 zero-emission and plug-in hybrid electric vehicles being sold for model years 2016 and 2017. As a result, Atabak Youssefzadeh, a Project Manager and shareholder of the station said he believes fueling stations in the future will need to move toward "the diversification of fuel in one location for the convenience of the consumer" as well as providing a "multi-income stream for the station to survive." He said "consumers need diversity and convenience and this paradigm was nonexistent in the gas station industry, which is the reason why we came up with the concept."

SCAQMD is helping to fund the ongoing operations of the hydrogen fuel station portion of this facility, which will utilize solar energy in a dual-electrolysis process to produce the hydrogen. In other words, the station will use energy from the sun, not the grid, to split water into oxygen and hydrogen, making this a 100% non-pollution source of fuel. The tank will store a total of 165 kilograms of hydrogen. The dual-electrolysis process will make 65 kilograms per day and is expected to be online next year. Hydrogen will be available soon, and unlike most other hydrogen stations in the state, the one in Ontario is staffed and can accept cash.

Of course this station would not be complete without also offering compressed natural gas and electric charging. What makes the CNG special is that 30% of the fuel is renewably sourced. Rather than all the natural gas coming from traditional places such as methane wells, a portion is derived from capture at landfills, livestock operations, or wastewater treatment. As for electric vehicles, customers driving EVs can charge their batteries in 30 minutes while a having bite to eat at the station's convenience store. There are also two slow chargers available for use.

Comparing Vehicle Technologies: The Benefits of Alternative Fuel Vehicles

Fuel Economy & Greenhouse Gas Rating – A rating system on greenhouse gas and tailpipe emissions from 1 (worst) to 10 (best).
MPG – Miles per gallon.
MPGe – Miles per gallon equivalent. This is a measure used by the U.S. Environmental Protection Agency (EPA) to explain the energy consumption of an advanced technology vehicle in comparison to the fuel economy of a conventional internal combustion engine.
Smog Rating - This rating reflects vehicle tailpipe emissions that contribute to local and regional air pollution. Vehicles that score a 10 are the cleanest.

Gasoline Vehicle — **MPG** 19 MPG

Cost Savings in 5 Years N/A **Driving Range** 200-300+ miles **Refuels with:** Gasoline
Average Charging/Refueling Time 5-10 Minutes
Smog Rating 7 **Fuel Economy & Greenhouse Gas Rating** 6

Diesel Vehicle — **MPG** 25 MPG

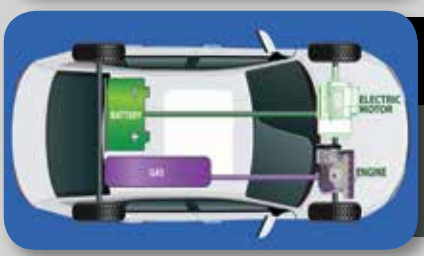
Cost Savings in 5 Years N/A **Driving Range** 400-500+ miles **Refuels with:** Diesel
Average Charging/Refueling Time 5-10 Minutes
Smog Rating 6 **Fuel Economy & Greenhouse Gas Rating** 5

Compressed Natural Gas (CNG) Vehicle
MPG 31 MPG (CNG only)

Cost Savings in 5 Years $6,250 **Driving Range** 200-225 miles
Refuels with: Compressed Natural Gas (CNG)
Average Charging/Refueling Time 5-10 Minutes
Smog Rating 9 **Fuel Economy & Greenhouse Gas Rating** 8

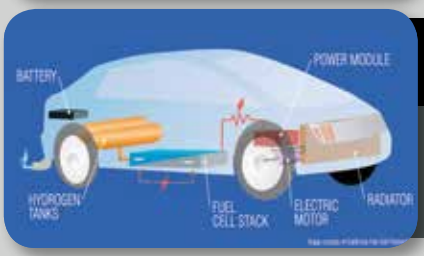
Extended Range Plug-In Hybrid Electric Vehicle
MPG 98-100 MPGe; 35-45 MPG

Cost Savings in 5 Years $8,000 **Driving Range** 20-80 miles (electric only); 250-300 (electric and gasoline)
Refuels with: Gasoline and Electricity
Average Charging/Refueling Time 8-12 Hours (120V); 3-4 Hours (240V)
Smog Rating 9 **Fuel Economy & Greenhouse Gas Rating** 10



Plug-In Hybrid Electric Vehicle (PHEV)
MPG 95-115 MPGe; 45-50 MPG

Cost Savings in 5 Years $6,750 **Driving Range** 10-20 miles (electric only); 450-500 (electric and gasoline)
Refuels with: Gasoline and Electricity
Average Charging/Refueling Time 3-7 Hours (120V); 1.5-3 Hours (240V)
Smog Rating 9 **Fuel Economy & Greenhouse Gas Rating** 10



Hydrogen Fuel-Cell Vehicle
MPG 50-70 MPGe (hydrogen only)

Cost Savings in 5 Years $6,000 **Driving Range** 200-300+ miles
Refuels with: Hydrogen
Average Charging/Refueling Time 3-8 minutes
Smog Rating 10 **Fuel Economy & Greenhouse Gas Rating** 10

Electric Vehicle
MPG 76-115 MPGe

Cost Savings in 5 Years $8,500 **Driving Range** 70-200 miles
Refuels with: Electricity
Average Charging/Refueling Time 20 Hours (120V); 8 Hours (240V); 20-40 Minutes (480V)
Smog Rating 10 **Fuel Economy & Greenhouse Gas Rating** 10