



Diesel Is Not a Dirty Word

The development of alternative powertrains and alternative fuels has been at the forefront of the US automotive industry for the past decade. A great deal of focus and resources have been dedicated to bringing to market new powertrains that can increase fuel efficiency, reduce pollutants, and enhance product performance.

All the while, there has been an engine type that has been providing performance and efficiency advantages since the early 1900s. Diesel-fueled engines have been powering the equipment in numerous industries, including mining, construction, and farming. Diesel-powered vehicles can help address many of the economic issues consumers are facing by offering better acceleration and performance, as well as improved fuel economy and driving range. Diesel vehicles are more expensive than those powered by conventional gas engines, but the price premium placed on diesel engines is far lower in comparison to hybrid electric, plug-in hybrid electric and battery electrics.

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New and Improved

For all of the benefits that diesel engines offer, consumers in general outside of Europe have not completely warmed up to this product as an alternative choice. Many still associate diesel engines with loud, rough idling vehicles that fill the air with smoke and odd smells. Others will recall the difficulties with starting diesel products in cold regions and the need to keep the engine warm or suffer the consequences. Today's diesel engine technology is nothing like the former version. With the introduction of clean diesel in the middle of the past decade, this technology still delivers benefits in fuel efficiency and performance but without the former baggage of unrefined operation and poor emissions.

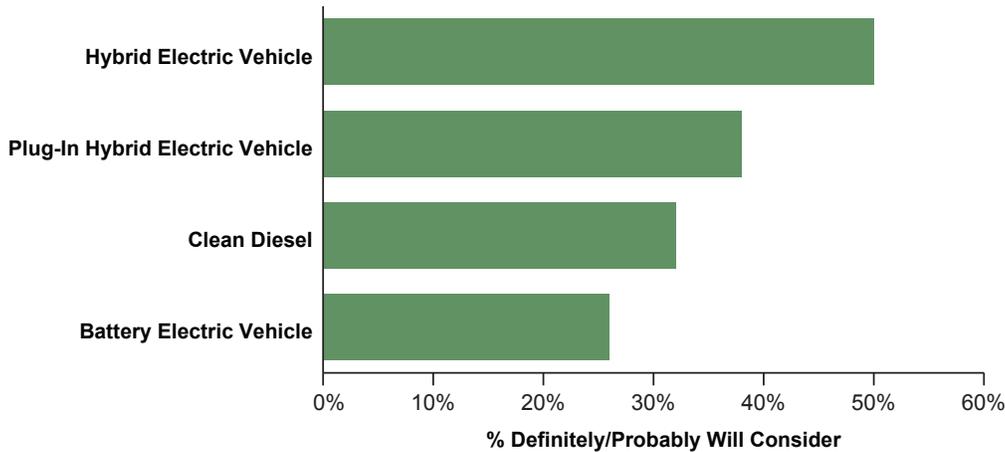
Still, clean diesel suffers from marketing deficiencies that are keeping it in the shadows of the US alternative powertrain arena. Greater awareness of clean diesel as a viable fuel source and its associated benefits is needed to boost consumer interest and acceptance. Despite offering the economies and performance that consumers seek—and at a more palatable price—clean diesel engines do not garner as much consideration from consumers as do hybrid electric or plug-in hybrid electric vehicles.



This *Power Insight*, excerpted from the inaugural *J.D. Power and Associates US Green Automotive StudySM*, focuses on the most important aspects of the alternative powertrain vehicle market. The study includes information from J.D. Power's extensive resources and data, perspective based on consumer data, forecast and social media information, and opinions from the company's experts in this market.

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Alternative Powertrain Consideration



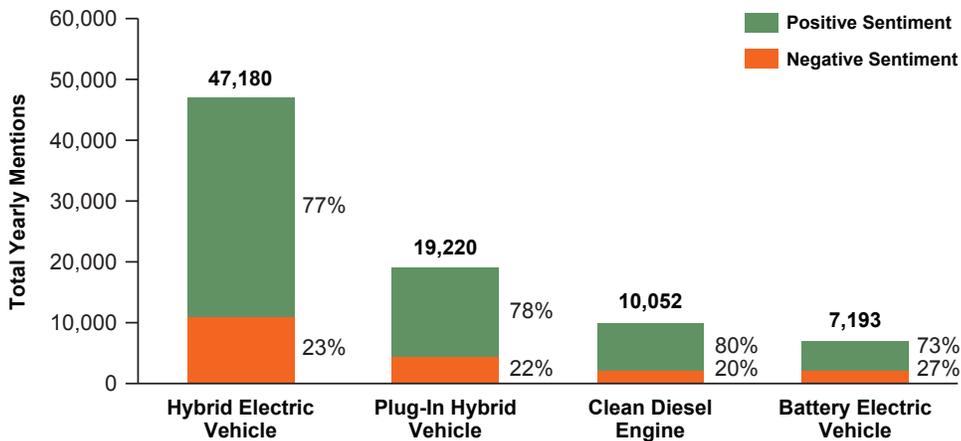
Source: J.D. Power and Associates

The J.D. Power Automotive Forecasting outlook for clean diesel sales calls for slightly more than 3% of US light-vehicle sales in 2011. Expectations are for this to improve in the coming years, reaching a 7% share by 2016, which represents approximately 1.2 million units.

Clean diesel engines are being received with strong positive consumer sentiment, an indication that it is shedding its former less-appealing reputation. Evidence of this sentiment has been captured by the J.D. Power Consumer Insights and Strategy (CIS) group, which conducted an extensive Internet scrape of 12 rolling months of unsolicited consumer mentions of vehicle powertrains, vehicle manufacturers, and overall discussions related to the growing green movement in the automotive arena. In assessing both the volume of discussions and whether the conversation was positive or negative in nature, clean diesel engines have the greatest proportion of positive sentiment.

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Discussion of Alternative Powertrains Technologies



Source: J.D. Power and Associates Consumer Insights and Strategy (CIS) Group

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Among the positive sentiment captured is a “coolness factor” that comes from diesel’s association with German brands such as VW, Audi, Mercedes-Benz and BMW. The performance benefits of clean diesel engines for these brands resonate well with consumers.

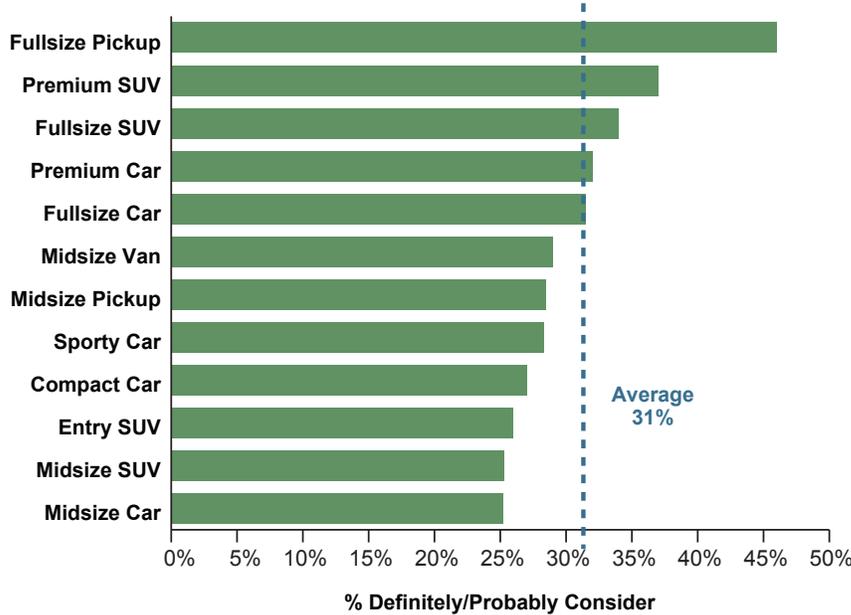
What isn’t as positive for clean diesel engines is the volume of discussions. Nearly five times more online mentions were measured for hybrid electric vehicles and nearly twice as many conversations on plug-in hybrid electric vehicles. Continued campaigning to generate awareness of clean diesel vehicle availability and its benefits will help improve both volume of discussion and consumer sentiment.

Right Choice for the Right Segments

With the offer of better acceleration, towing, and fuel efficiency, clean diesel engines are perceived as a more attractive option for vehicles in the performance and “workman-like” segments. Consumers likely to purchase fullsize and premium vehicles, particularly trucks, have a much higher level of consideration for clean diesel engines than those considering midsize and compact vehicles.

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Consideration of Clean Diesel



Source: J.D. Power and Associates

The most common benefits cited by consumers interested in clean diesel vehicles include lower fuel costs through improved fuel economy, driving range on a single tank of fuel, and higher engine power/torque.

However, along with this strong consumer sentiment, there remains a widely viewed concern that even the most ardent clean diesel advocate acknowledges: rising fuel costs. Clean diesel fuel is priced about 8%-10% higher than gasoline per gallon, and the immediate pain felt at the pump creates some distress. Additionally, the price premium, while less than what is paid for a hybrid electric, plug-in hybrid electric, or battery electric vehicle, is still noted as a significant hurdle. Considerers of clean diesel engines also

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express interest in less-expensive features that can improve fuel economy in conventional gasoline engines. Additionally, there is a fair proportion of clean diesel engine considerers that are concerned about the higher costs that maintenance will require.

The aforementioned concerns regarding clean diesel engines are addressable by automakers. Continued advancements in the product or in marketing will only improve consumer interest and confidence. However, the availability of diesel fueling stations is outside of the control of the manufacturers. It is estimated that less than one-half of the service stations in the United States offer diesel pumps. This condition limits consumer commitment to clean diesel vehicles.

Clean Diesel in the United States

The potential for clean diesel engine vehicles to represent a more sizeable portion of the US market is contingent upon a number of factors. Greater awareness of the benefits and the relatively low price premium would stimulate interest and advocacy. On the other hand, there likely will be consumer push-back should fuel prices continue to rise. US consumers are not used to gas prices in excess of \$4 per gallon. Unlike in Europe where diesel fuel is viewed as a good alternative to offset high fuel prices via improved fuel economy, US consumers are more apt to consider diesel as simply a higher-priced fuel.

The opportunity to target larger trucks and SUVs as well as premium segments will be where clean diesel vehicles can make the greatest inroads. These consumers already place the greatest value on the attributes that clean diesel engines best accentuates: performance, power, acceleration, and efficiency. In order for clean diesel vehicles to begin to appeal to consumers outside of this consideration set, clean diesel pumps will need to be available at every fueling station.

For more information about our products and services, please contact:

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