VW faces daunting challenges in fixing emissions cheating

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Volkswagen faces daunting challenges in fixing software that enables cheating on diesel engine emissions tests, a task that's becoming more urgent because of growing anger from customers.

The company has set aside $7.3 billion to pay for the scandal. But experts say it's likely to cost much more as VW tries to comply with U.S. clean air regulations while appeasing diesel owners who paid extra for the cars, thinking they could help the environment without sacrificing performance.

"We understand that owners of the cars affected by the emissions compliance issues are upset," VW said on a consumer website launched Sunday. The company asked for patience and said it would address the issue as fast as it can. A spokeswoman wouldn't comment further.

But experts said VW will have to strike a careful balance to appease government regulators, make customers happy and avoid emptying the company cash box. A cheap remedy of software fixes likely would hurt performance and gas mileage, further antagonizing customers. A more expensive fix that adds a treatment system wouldn't hurt performance, but it would cost thousands per car and by one analyst's estimate, could total more than $20 billion including vehicles in the U.S. and Europe.

That's in addition to a potential $18 billion fine in the U.S. and the cost of numerous class-action lawsuits alleging that VW's cheating reduced the value of its customers' cars.

The scandal broke on Sept. 18, when the U.S. Environmental Protection Agency and the California Air Resources Board accused VW of installing secret software on 2-liter four-cylinder diesel engines that turned on pollution controls for lab tests and shut them off during real-world driving. As a result, 482,000 Jettas, Beetles, Golfs and Passats from the 2009 to 2015 model years belched out 10 to 40 times as much ozone-causing nitrogen oxide as U.S. law allows.

A few days later, VW admitted the same "defeat device" that switched the pollution controls on and off was on 11 million cars worldwide. Germany says 2.8 million cars there are affected.

Software in the main engine control computer figured out when the cars were being tested on a treadmill-like device called a dynamometer that the EPA used for verification and turned the controls on.

With the pollution controls on, the cars are less efficient and won't accelerate as fast, the two main reasons why people bought the VW diesels, said Matt DeLorenzo, managing editor and a diesel expert for Kelley Blue Book. VW could change the software and leave the controls on to satisfy the EPA and California regulators. But that would anger customers and likely would force VW to compensate them for the reduced mileage, just as Hyundai did when it got caught with inflated fuel economy estimates, DeLorenzo said.

"If it's really sluggish and doesn't get out of its own way, that's a bigger issue (to customers) than fuel economy," DeLorenzo said. "People notice that big of a change in performance."

The other option is to add a diesel exhaust treatment system that's used by other manufacturers and even by VW on larger diesel engines. The treatment involves adding a tank of a chemical called urea, which enables the cars to separate nitrogen oxide into harmless nitrogen and

oxygen. That would cost $2,000 or more per car, DeLorenzo said.

Engineers would have to find room for a tank to store the blue urea fluid, which has to be refilled about every 7,500 miles, DeLorenzo said. And VW probably would have to compensate customers for years of urea cost, which is about $13 for 2.5 gallons.

VW probably tried to avoid urea systems in the beginning because their cost would have driven Jetta and Golf prices above competitors, especially gas-electric hybrids, DeLorenzo said. Now, adding it after the fact will cost even more, he said.

The scandal has forced Volkswagen to tell U.S. dealers not to sell cars with the suspect diesel engines. VW said on Sunday that it's working to get government approval to sell 2016 models with updated engines "which we believe do not have any of the issues the government has identified in other vehicles."

The 2015 and 2016 models have a new version of the 2-liter diesel engine that probably runs cleaner and could need just a software change to comply, DeLorenzo said.

But on older models from 2009 to 2014, the fix may be more difficult. Mike Jackson, CEO of AutoNation, the largest dealership chain in the U.S., said he was told by VW that it will take hardware and software changes to fix the older models. The EPA says it may take VW a year to develop a fix.

Before the 2009 model year, U.S. diesel emissions standards weren't as strict, so those cars likely passed the tests without a defeat device, DeLorenzo said.

Whenever the fix comes, it's possible that owners might not get it done if

it hurts their cars' mileage and performance, and the EPA can't force people to take their cars in for repairs. The agency only has authority over automakers, not car owners.

The EPA says some states require proof that emissions recalls have been fixed before license plates are renewed. And the possibility of failing emissions inspections in states that require them apparently won't be an issue because of the cheating software. "The defeat device was specifically designed to ensure that vehicles would pass inspection," the agency says on its website.