CLEANER AIR, MORE COMPLEX ENGINES

Black smoke from farm vehicles will disappear as stronger emission standards kick in.

What reduced-emissions diesel engines will mean to your farm.

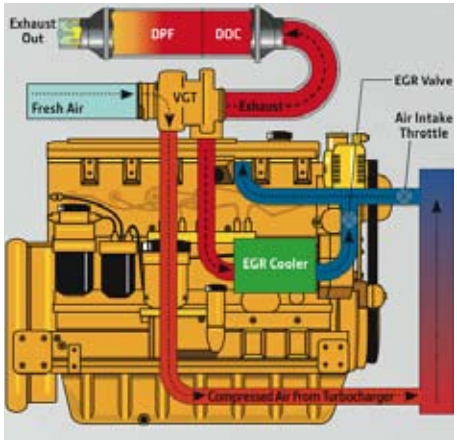
BY JIM PATRICO

Decisions. Decisions. For several years, farm equipment manufacturers have lost sleep over something called interim Tier 4. First they had to decide which technologies would best meet this new federal air-quality standard, the first phase of which kicks in Jan. 1, 2011. Then they had to decide which engineering and manufacturing trade-offs would produce the best products. Finally, they had to decide which marketing strategies and which price points would best convince you they had done a good job.

Now it's your turn to make decisions about interim Tier 4.

To help, here is a little background:

In 1994 the Environmental Protection Agency announced that manufacturers of diesel-powered vehicles would gradually have to cut emissions from their products: small steps in Tiers 1 and 2, larger steps in Tier 3, then really big emissions reductions in interim Tier 4 and final Tier 4. We've just about reached interim Tier 4, with the final tier three years out. On-road vehicles were fast-tracked in the process. They have been under similar guidelines since 2008.



Interim Tier 4 EGR systems utilize cooled exhaust gas recirculation. Proponents say the EGR advantage is that it uses only one type of fluid (fuel) not two like its competitors, which require a second fluid for reducing pollution.

Meeting the Tier 4 guidelines was a multifaceted challenge for ag equipment manufacturers. First there was the daunting engineering challenge of cutting emissions of particulate matter by 90% and oxides of nitrogen by 50%. Then, engineers had to figure out how to do that without reducing work output or efficiency. Finally, the companies had to cope with inevitable cost increase to their manufacturing division and to their customers.

Well, the bets are all in. By midsummer the major farm equipment manufacturers had announced which engine technologies they will use to meet interim Tier 4 emissions standards for 175-hp and larger diesel engines. The two-to-one favorite: Selective Catalytic Reduction (SCR) technology. AGCO and CNH picked SCR as the horse to bet on in this race. Deere, alone among the major ag equipment brands in the U.S., wagered on cooled Exhaust Gas Recirculation (EGR) as the technology to meet EPA guidelines. (Claas is still unclear about its intensions, although it does say its machines that use Mercedes engines will use an SCR system, while its machines that use Caterpillar engines will go with EGR.)

PHOTO: JIM PATRICO

AGCO placed its money on its "e3" branded engines, which are built by its European subsidiary AGCO Sisu Power. CNH will use engines built by its European sister company, Fiat Powertrain Technologies (FPT). Both manufacturers point out that European diesel engines have long had to meet tougher emissions guidelines than those in North America. As a result, they have a long history. FPT, for instance, already has made and sold more than 10,000 SCR-based engines.

John Deere's engines will not have that history. But Deere will tell you its interim Tier 4 engines have the advantage of being designed specifically for its vehicles. So there is your first decision: long history versus homegrown.

Makers of SCR equipment claim its design maximizes engine efficiency because much of the emissions control takes place downstream from the engine itself. SCR systems inject at about a 3% ratio to fuel a nontoxic, colorless, odorless mixture of chemical urea and water (DEF) into the exhaust system to reduce emissions.

Upside: the engine itself is not part of the emissions control system and therefore can be tuned for maximum efficiency. Downside: SCR systems require an extra fluids tank that has to be filled with DEF. SCR systems use a heater system to prevent freezing.

Makers of EGR systems, on the other hand, say their system is simpler and it requires only one fluid: a fuel. EGR engines use high temperatures to burn exhaust gases that are recirculated into the engine. A filter in the exhaust stream then traps remaining particulates. Upside: One fluid is easier to manage than two and also costs less. Downside: EGR can produce high heat levels, especially as the engine occasionally "regenerates" the filter by injecting fuel and burning at a temperature high enough to turn trapped particles to ash.

Your decision: one fluid or two

Of course, SCR manufacturers will try to influence your decision by telling you that SCR systems are inherently more efficient. AGCO will point with pride to recent news that its Massey Ferguson 8600 Series tractors equipped with e3 engines set a fuel efficiency record at the University of Nebraska Tractor Test Laboratory. And Deere will respond that those tests did not consider the inconvenience and cost of having to use two types of fluids rather than one.

SCR opponents will tell you that DEF not only will be expensive, it will be a hassle. But Jason Hoult, AGCO's product marketing manager for high-hp wheeled tractors, will tell you that argument is wrong on two counts.

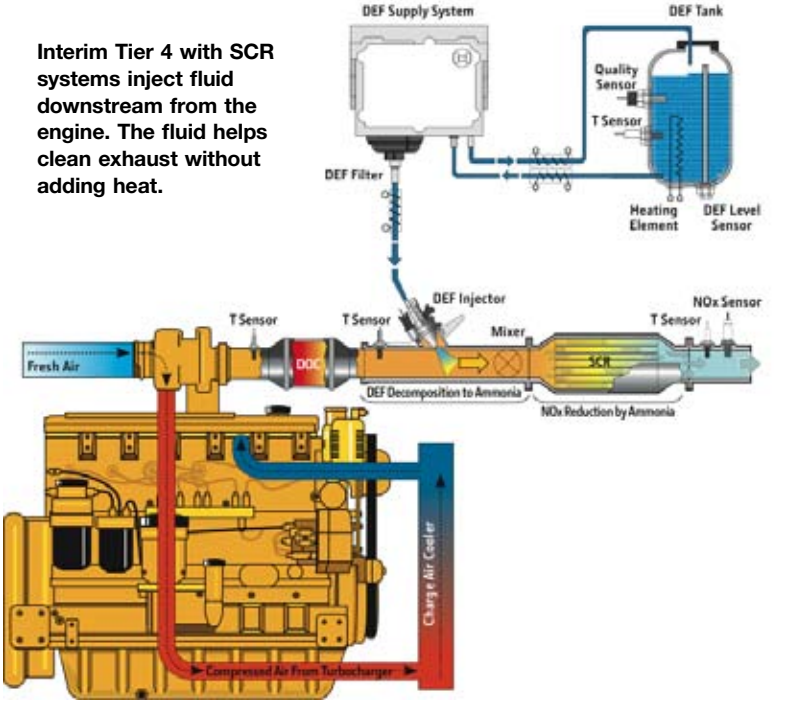
First, a small tank of DEF will last as long as two tanks of fuel, so there is not that much extra fluid involved. While prices aren't set yet, Hoult expects a bulk price of $2.50 to $3 per gallon of DEF. Second, Hoult says DEF will be accessible. AGCO dealers will stock DEF, and more than 2,700 outlets already carry the stuff to service over-the-road truckers, many of whose vehicles use SCR systems.

You might already have gleaned an idea about how the SCR and EGR camps will try to sell their approach to you. Here is the kicker: No matter which system you decide to buy, you will have to pay about 5% more for an interim Tier 4-compliant vehicle.

That fact had many farmers rushing to their dealers to make 2010 equipment purchases. If you have not already joined the rush, chances are pickings will be slim for noncompliant equipment. Manufacturers anticipated the rush and built a few extra tractors. But they weren't going to spoil their 2011 sales by overproducing equipment in 2010. Idle factory lines are an ugly sight.

But if you want noncompliant (less expensive) equipment, don't despair. Not all ag equipment built after Jan. 1 will be interim Tier 4-compliant. The EPA has given some leeway to companies; they get credit from the EPA for the emissions levels of their entire fleets. So they can pick a few equipment lines—combines, for example—to set aside for later compliance.

BEST IDEA: Talk to your dealer now. Then make your decisions about interim Tier 4-compliant equipment.



Interim Tier 4 with SCR systems inject fluid downstream from the engine. The fluid helps clean exhaust without adding heat.