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As mower manufacturers prepare to roll out emission-compliant equipment, the industry provides some clarity on the impact Tier IV will have at the course level.

From the moment President Richard Nixon signed the Clean Air Act in 1970, industries across the country have been working toward improving the air we breathe. Be it cars and trucks on the roads or factories that dot our landscape... this crucial policy has saved countless lives by reducing harmful pollutants.

While the golf course industry has been at the forefront of many environmental issues, the Clean Air Act is now taking center stage as the new Tier IV begin to take hold.

Environmental Protection Agency's website reads:

"EPA has adopted a comprehensive national program to reduce emissions from future non-road diesel engines by integrating engine and fuel controls as a system to gain the greatest emission reductions. To meet these emission standards, engine manufacturers will produce new engines with advanced emission-control technologies similar to those already expected for highway trucks and buses. Exhaust emissions from these engines will decrease by more than 90 percent. Because the emission-control devices can be damaged by sulfur, we are also adopting

a limit to decrease the allowable level of sulfur in non-road diesel fuel by more than 99 percent."

These reductions in NOx and PM emissions from non-road diesel engines will provide enormous public health benefits. EPA estimates that by 2030, controlling these emissions would annually prevent 12,000 premature deaths, 8,900 hospitalizations, and one million work days lost.

The NOx – or oxides of nitrogen – form smog, while PM – or particulate matter – comes out of exhausts as smoke. The PM will see the most significant reduction – a 90-percent decrease from current standards.

While equipment manufacturers work closely with companies building the engines for their machines, Grant Young of Toro says his company and its competitors are waiting for final engine specifications before moving forward.

"From there, the equipment manufacturers have to make it work in the equipment, which is where engineering dollars for the equipment manufacturers comes into play," Young says.

Rachel Luken, Jacobsen product manager, says her company has taken a hands-on approach. "Jacobsen has been working in conjunction with our diesel engine supplier, Kubota, on technology methods and approaches to meet the lower emission standards," Luken says. "With Kubota's rugged and reliable engine expertise, coupled with Jacobsen technical staff, we believe we are designing and incorporating engines, filtration and electric needs in efficient and innovated ways.

Jacobsen will be utilizing multiple solution paths for the range of products affected, such as:

- Conventional Tier 4 Final path using fuel injection and exhaust after-treatment technologies, while also paying close attention to the machine's hydraulic and electrical efficiencies so optimal power is transferred; and
- Utilizing engines under 25 hp by reducing

VIEW

by Rob Thomas

power without compromising overall performance or supplementing with hybrid power to manage peak power demands.

"Jacobsen is also striving for commonality and consistency where possible between existing product and across newly powered product to reduce customer technical maintenance and service parts complexity," Luken says.

"Ultimately, Jacobsen is using innovative solutions to make equipment more environmentally friendly while still meeting customer performance, productivity and quality expectations," she adds.

Mark Ford, marketing manager at John Deere Golf, says his company is looking beyond the Tier IV standards.

"Our objective is to do more than meet

Replacement plan

Jacobsen offered a few thoughts to consider as capital equipment budgets are developed for new or replacement equipment:

- Buy on regular routine: When a capital equipment plan calls for new equipment and/or existing equipment useful life ends, buy what is available and pay market price.
- Buy ahead: Prices are forecasted to rise when Tier IV compliant equipment is released, so postpone the purchase of higher-priced equipment and buy in advance of a regular replacement cycle.
- Buy environmentally friendly: Despite the expected higher prices, actively seek out and purchase the greenest Tier IV product.
- Buy used: Since equipment is compliant based on the year of engine manufacture, buy equipment that is already in use.



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the requirements of Final Tier IV," Ford says. "We are using this as an opportunity to provide additional value for golf course superintendents and technicians."

The John Deere approach is five-fold:

- Optimized. Engineering and product development teams are working to ensure the equipment fully meets regulatory requirements, while delivering the power, reliability and low cost of ownership.
- Fluid efficiency. Rising fuel costs are on everybody's minds. Deere's Final Tier IV-compliant equipment will not compromise on fuel efficiency.
- Field proven. Deere engages in a comprehensive program of field testing prior to new equipment launch. Machines that meet these new standards undergo thousands of hours of testing before they are released.
- Integrated. Deere's engineering, supply management and product management teams have been engaged in a thorough, ongoing design review with engine and component suppliers to work hand-in-hand to supply the most seamless solution possible.
- A Fully supported solution. A history of agricultural and construction equipment manufacturing means the John Deere enterprise has a great deal of experience transitioning to new compliance standards. They will be there as an organization for customers every step of the way.

Positives are plentiful, but John Patterson, president of the International Golf Course Equipment Managers Association, expects to see the price for new equipment rise substantially.

“When it comes to cost increase, the number I am hearing most often is 20 percent for affected machines which remain diesel powered, and between 10 and 15 percent for machines which are converted to gasoline power, to cover the cost of development.”

— John Patterson, International Golf Course Equipment Managers Association

“When it comes to cost increase, the number I am hearing most often is 20 percent for affected machines which remain diesel powered, and between 10 and 15 percent for machines which are converted to gasoline power, to cover the cost of development,” Patterson says.

“At PGA National we are evaluating the cost benefits of turning our large equipment fleet (for 90 holes) one year early, potentially saving \$100,000 in purchase cost, plus R&M savings,” he says. “It is difficult for any operation to accelerate capital purchase plans, but potential six-figure savings are very persuasive.”

There are other options, Patterson says, but at what cost?

“There may be a slight increase in the used equipment market, but generally the increased cost of running older equipment far offsets the higher initial cost of new, efficient – and warrantied – stock,” he says. “Those who would normally purchase outright may be more likely to look at leasing for tax benefits to offset the purchase cost as well.”

While the Tier IV regulations are forcing changes and likely adding cost, Luken says Jacobsen has evolved with the environment in mind since the Clean Air Act amendments affected off-road diesel regulations

(continued on page 79)

New standards

Considering the shakeup across the industry - from engine and equipment manufacturers to golf courses – many wonder if the Tier IV emissions regulations constitute the “finish line” or if there are even higher standards to meet on the horizon.

“I believe we will be done with this type of regulation for a while, but it is anyone’s guess,” says Stephen Tucker, equipment manager for the Ritz-Carlton Members Golf Club in Bradenton, Florida. “Regulations are driven by government policy, so as new policies are approved and mandated, our regulations will change. Nature of the beast, I guess. Maybe one day they will ask the effects of the policy before implementing it, but of course why would they do that ... makes too much sense?”

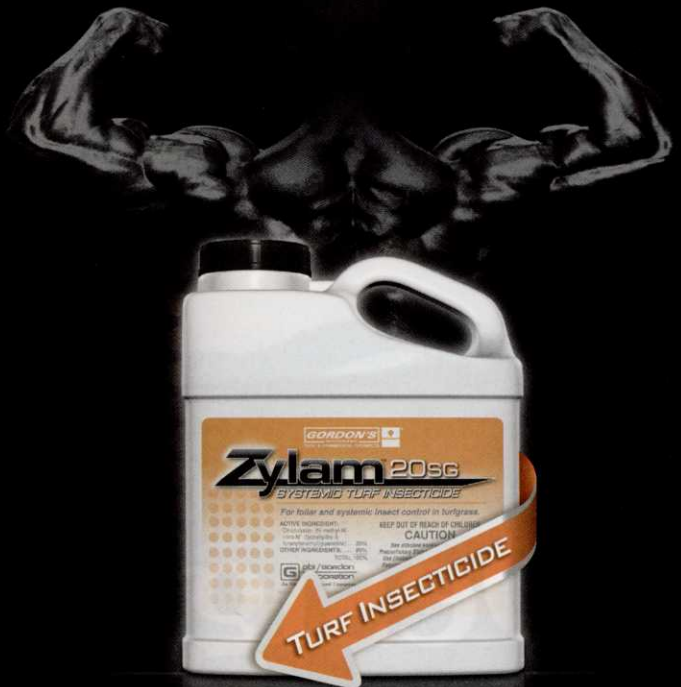
Tucker sees potential for fleet changes at many courses.

“I believe you will see a gas version of many of the machines that will fall into Tier IV,” he says. “I really believe this is the direction that most facilities will go as long as the machine can perform to the same level and the costs remain where we currently are or less.

“If you’re an equipment manufacturer this becomes an even tougher question because they are not sure what direction the industry will go, so you can’t really put all of your eggs in one basket ... or at least I wouldn’t.”

John Patterson, president of the International Golf Course Equipment Managers Association, joked “Tier IV is it until we all get the new ‘Mr. Fusion’ power plants.”

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in the mid 1990s.

Many Jacobsen models will ultimately go through as many as five different lower-emissions standards: Tier 1-3, Tier 4 Interim, and Tier 4 Final," Luken says.

"In past tiers, the adaptation of the new lower-emission-com-

pliant engines into equipment was more streamlined," she says. "In most cases the changes were internal to the engine with minimal mechanical and electric affect to the host pieces of equipment. Therefore, the cost to the market place were typically absorbed or incorporated into normal pricing cycles."

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*– Stephen Tucker, equipment manager,
Four Seasons Resort and Club*

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Now with the upcoming new Tier 4 Final, the cost to make engines and equipment meet the lower emission standards is much greater – significant R&D, engineering, development and testing investments are being spent by both engine and turf equipment manufacturers to ensure their ability to meet the standards, Luken says.

"Tier 4 Final compliance means much more than just an engine change," says Luken. "There are many more components and subsystems external to the engine that will need to adapt."

According to Luken, the Tier 4 Final turf equipment will be outfitted with new engines and exhaust systems with advanced electronic controls, additional filtration and after-treatment, and updated cooling systems, to name a few. To accommodate

these new, additional, and larger components, many turf equipment chassis, engine compartments, and functional controls require redesign... leading to added costs.

Young agrees that the previous tiers of compliance haven't been

as onerous in terms of technology, complexity or cost.

"Most have been transparent – or of nominal consequence – to the end customer," he points out. "That says, we are always looking at alternative fuel/energy options, many of which have benefits – one being lower emissions – but typically come with a cost."

As for the increased cost to the consumer, Young says attempts to lessen the financial impact by Toro is always ongoing.

"One thing to remember in this is the engine, and decks/cutting units are usually the majority of the expense as it relates to a mower," Young says. "So, when the cost of the engine goes up significantly, you have to look very hard at the rest of the machine to recoup or find cost savings to offset, and weigh that against what those may mean in terms of performance and/or customer satisfaction."

Stephen Tucker, equipment manager, Four Seasons Resort and Club, Dallas at Las Colinas, believes looking well into the future will soften the economic impact of Tier IV regulations.

The best way to lessen the

impact is being proactive in planning out your equipment purchases or leases for the next eight years, Tucker says.

"Whether you have the capital money to spend or not, there should always be a plan," he says.

Tucker also believes general managers and owners need to get educated on Tier IV now so they can make the right decisions going in, or at least know the impact.

"It is much easier to plan for bumps in the road than to have to make a decision once you have it right in front of you," Tucker says.

He adds that everyone needs to be open to the alternatives such as gas engines.

"At the end of the day, if we can get the grass cut without sacrificing quality for less money, then that is the decision we should be making right now," Tucker says.

While the new systems and technologies come with a price, they may also allow improvements to engine noise, sound levels, performance and diagnostic capabilities that may provide return on the purchase price investment, according to Luken.

"Jacobsen is also exploring innovative, non-conventional approaches where technically feasible to deliver lower emissions and meet compliance where needed using additional non-diesel power to manage peak power demands," Luken says. "A hybrid-powered solution would alleviate a portion of the equipment's total cost of ownership by offering fuel savings up to 40 percent annually."

She points to the Jacobsen Eclipse 322 riding greens mower as an example. It utilizes true hybrid power – lower hp engine coupled with buffer electric power to deliver equivalent total system power – and when com-

paring that to other all-engine-powered and hydraulic machines in its class, it delivers significant annual fuel savings, as well as saving on hydraulic oil since it is an all electric machine.

Jacobsen offers an online cost savings calculator to estimate possible savings (www.jacobsen.com/eclipse-calculator/).

If the bottom line is cost, Tucker sees a great deal of uncertainty.

"In an economy that is unstable with rising fuel costs and a business that needs some normalcy, this will make an impact which some are addressing now," he says. "We have been asking for advancements in technology over the years and the manufacturers have delivered with hybrids and such.

"However, at the end of the day, in the current economic climate," he adds. "We just need to get the grass cut for the least amount we can do so without impacting the quality.

"We can work on advancements later," Tucker concludes. "Let's make some cost-effective machines and get past this rough spot, then push toward technology advancement again."

Patterson knows superintendents and course management will adapt.

"The IGCEMA's tag line is 'Educating technicians for the future' and we hold the belief that any new technologies developed within our industry can/will be mastered through education," Patterson says. "Just as with any other new technology (or change), most will embrace it, many will complain, some will resist it, mistakes will be made, but ultimately it will become mainstream." **GCI**

Rob Thomas is a Cleveland-based freelance writer and frequent GCI contributor.