

# New Life for Used Oils

Taking stock of the recycling and re-refining sector

By Robert Bittner



**T**here are significant benefits to finding new uses for used oil.

According to the December 2020 U.S. Department of Energy's (DOE) report, *Used Oil Management and Beneficial Reuse Options* — the first comprehensive government assessment in more than a decade — recycling and re-refining extend the life of crude oil resources and reduce the likelihood that used oil will enter the environment and contaminate soil and water due to improper disposal. In addition, it requires less energy to recycle used oil than to create new lubricating oil from virgin crude. "Further," the report said, "used oil recycling supports thousands of direct and indirect jobs, generates tax revenue and helps provide consumers with a range of economical product choices."

Because of these and other factors, the used oil segment is growing. But there continue to be untapped potential, unique challenges and persisting misconceptions regarding recycled and re-refined oils.

### THE STATE OF THE MARKET

Any discussion of the used oil market must begin with a disclaimer: The industry does not lend itself well to accurate statistics. A variety of used oils are being collected by a large and diverse number of companies, both big and small, many of which are privately owned. As the DOE report noted, "Accurate analysis of the used oil marketplace in the United States is currently hindered by a lack of detailed data regarding the volumes of oil lost in use, the volumes collected and remaining uncollected, volumes that are improperly disposed of, volumes burned legally and volumes processed and reused but ultimately not re-refined."

With that caveat in mind, the total demand for lubricants in the U.S. is reported to be about 2.5 billion gallons a year. Of that amount, 1.26



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billion gallons are industrial oils, while 1.21 billion gallons come from automotive fluids. The remainder is greases. Notably, a large amount of the total oil — just over 1 billion gallons — is actually consumed in use, particularly by industry. That leaves about 1.4 billion gallons to be collected as used oil. Of that amount, U.S. collectors recovered an estimated 949 million gallons, leaving 300 million to 400 million gallons unaccounted for.

While 300 million gallons is a small fraction of the overall lubricants total, it nevertheless represents a significant amount of oils going unaccounted for. "Globally, far too much used oil is wasted through improper disposal or burning," said Ian Moncrieff, vice president of Kline Group, which contributed to the DOE report. "Collection efficiency needs to be improved."

In addition, he believes that, as extended producer responsibility, or EPR, schemes gain greater support worldwide, more governments will apply incentives and/or penalties to encourage improved collection and greater emphasis on recycling used oils. "The very fact that some of the lubricants industry's leading marketers are now actively evaluating how to participate in this space is perhaps the best indicator that the used oil value chain is progressively becoming mainstream," he said.

### THE PROCESS

In general, an oil product has two basic functions: It can be used either as a lubricant or used as fuel, through burning or consumption. "Whether it's coming from industry, a quick-lube

shop or a do-it-yourselfer, a used lubricant still retains those two same functions, even though it will now contain impurities," explained Scott Parker, executive director of recycling association NORA. "So, it requires processing before it can be used again."

(Generally speaking, recycling and re-refining can be done with any used oil, unless it contains toxic contaminants. In addition, although bio-based oils are sometimes touted as being more environmentally friendly, they are not currently re-refinable.)

"Once we receive it, different things can happen to that oil, depending on the type of processing it's undergoing," Parker said. "Basic processing means removing the water through dehydration, filtering and maybe the addition of a chemical treatment."

This recycled oil often ends up being sold to the asphalt industry. There, it can be used as fuel in asphalt plants, heating the aggregate before it gets spread on the road and as a product called vacuum tower asphalt extender (VTAE), which is used in road paving and roofing applications.

"There have been misconceptions in the past about VTAE," acknowledged Ellie Bruce, vice president of business management and marketing for Heritage-Crystal Clean, an environmental services company that includes waste recovery centers and an oil re-refinery. "In recent years, there was the idea that VTAE caused premature cracking when it was used in road paving. It's since been proven that, when used properly, VTAE is not the problem; it's actually a very good product. We've learned that the problem was that

some asphalt suppliers were introducing shredded roofing shingles into the asphalt, and that was the issue.”

Re-refining requires more advanced processing. “This usually includes distillation and hydrotreating,” Parker said, “and it’s capable of generating a base oil that many ILMA members could use as a base lubricant, for whatever blending they need to do for their customers. Advanced processing also can be used to produce a vacuum gas oil or marine diesel oil, depending upon the specific processing involved.” Often, these re-refined oils meet or exceed technical specifications for a virgin oil.

Because of their recyclability, used oils help customers achieve higher levels of ecological sustainability. “People come to us because they want to improve their green story,” Bruce said. “As more companies are wanting to develop their environmental, social and governance story and talk about their sustainability efforts, we definitely are seeing more inquiries.”

### QUESTIONS AND PRECONCEPTIONS

Along with customer inquiries come questions, concerns and, often, preconceived ideas about used oils.

Matt Munz, Heritage-Crystal Clean’s vice president of base oil sales, said, “Depending on the application, discussions are usually related to the quality of the oil — for example, what is our flash, what is our cold crank — or about approvals with additive companies.”

Customers historically have objected to re-refined base oils and lubricants because of concerns — sometimes warranted — related to inferior quality and unreliable supply relative to virgin base oil sources. “Until recently, no major oil company would blend re-refined base oils into its lubricants,” Moncrieff noted. “BP was the first to change that position, when



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Castrol launched its GTX Eco brand on a limited scale in India in 2016. Valvoline tried it earlier, in 2011, with its NextGen brand, which contained 50% recycled base oils, but this product has had mixed success.”

Once customers are convinced of the quality, Munz said, talk then turns to logistics and pricing for the order. It’s not unusual for customers to assume that re-refined oils will be cheaper than the virgin alternatives, simply because they have been previously used. While that once might have been true, recycled oils are now competitive with virgin oils in price due to improvements in re-refining technology and the subsequent higher quality of the recycled base oil.

“The attitude toward re-refined lubricants and base oils in a notoriously conservative industry is changing slowly,” Moncrieff said. “But it is changing.”

### THE COLLECTION CONCERN

While the recycling and re-refining segment is continuing to grow in quality and acceptance, the efficient and comprehensive collection of used oil continues to be a concern.

“As an industry, our primary focus is to aggregate all of this used oil, which is being generated in tens of thousands of locations across the country,” Parker said. “We work with the DOE — and we always are working with our members — to make sure the public is aware that you can’t dump this stuff down the drain or throw it in the trash.”

As a result of these efforts, he said, “We have more recycled content available from advanced processing

than we’ve ever had before. But there’s always room for improvement.”

Achieving that improvement remains one of the main challenges for the used oil sector. “Used oil collection is a fragmented business,” Moncrieff said, “with hundreds of small and medium-sized collectors in the U.S. alone. It’s a business of scale and logistics management. Large, multi-state collectors and aggregators can bring efficiencies to used oil collection and aggregation that ‘mom and pops’ cannot. The leading companies have recognized that successful re-refining requires an integrated used oil supply chain. Nonintegrated re-refiners suffer from lack of control over their raw material pricing and quality.”

Moncrieff believes that market leaders in the U.S. have been at the forefront of managing used oil recycling programs to collect, re-refine, blend to lubes and recycle replacement lubricants to the point of origin. Yet there is still more to be done.

“Used oil collection needs to recognize that the only leverage point in the used oil value chain is at the interface between the generator and the collector,” he said. “Understanding netback pricing forces is a key distinguishing characteristic of efficient collectors, most particularly when crude oil prices are low and the value of used oil to generators becomes negative. More used oil can be supplied to re-refineries over time because market dynamics are encouraging it, such as improved rail logistics for bulk movement, better segregation of used oil sources and improved quality of lubricants and, thus, used oil.”

## LOOKING AHEAD

The DOE report concludes that the near future for the used oil sector will be influenced — both positively and negatively — by at least three factors.

First, demand for higher-performing lubricants is expected to grow in response to automotive and industrial requirements. While the impact of this remains to be seen, it may push recyclers to develop new technologies and processes that will increase both the performance and appeal of recycled and re-refined oils, while also strengthening overall interest in used base oils.

Second, soon-to-be-implemented United Nations International Maritime Organization regulations limiting the sulfur content of marine bunker fuel are expected to lead to declining sulfur-fuel markets. “Used oil sources

tied to high-sulfur fuel will see lower used oil values and, in tandem, the value of used oil in traditional fuel markets will likely decline,” the report stated.

Finally, a robust domestic supply of low-priced natural gas will continue to lower demand for used oil as a fuel. “These external factors are likely to enhance the dynamic nature of the domestic used oil sector,” the report summed up, “making it even more important for the stakeholders to have access to accurate data and for there to be policies in place to support a healthy and robust used oil collection and reuse industry.”

At the manufacturer or supplier level, Bruce said, “I think we’ll continue to see consolidation among the used motor oil collectors. And I think the new administration will

help in creating a kind of preference for re-refined products, either through pricing or other incentives.”

“It’s hard to imagine that sustainability will become less important in the future,” Moncrieff added. “In time, any major lubricants marketers will need to develop sustainability plans for that business, which demonstrate their responsible custody over the life cycle of their products, as well as their environmental impacts.”

While he has seen little tangible evidence of that responsibility from the majors to date, Moncrieff believes that will change going forward. “We’re on the cusp,” he said. “The future for re-refining will be brighter.”

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