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2024
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FEBRUARY



SPECIAL REPORT | BASE STOCKS

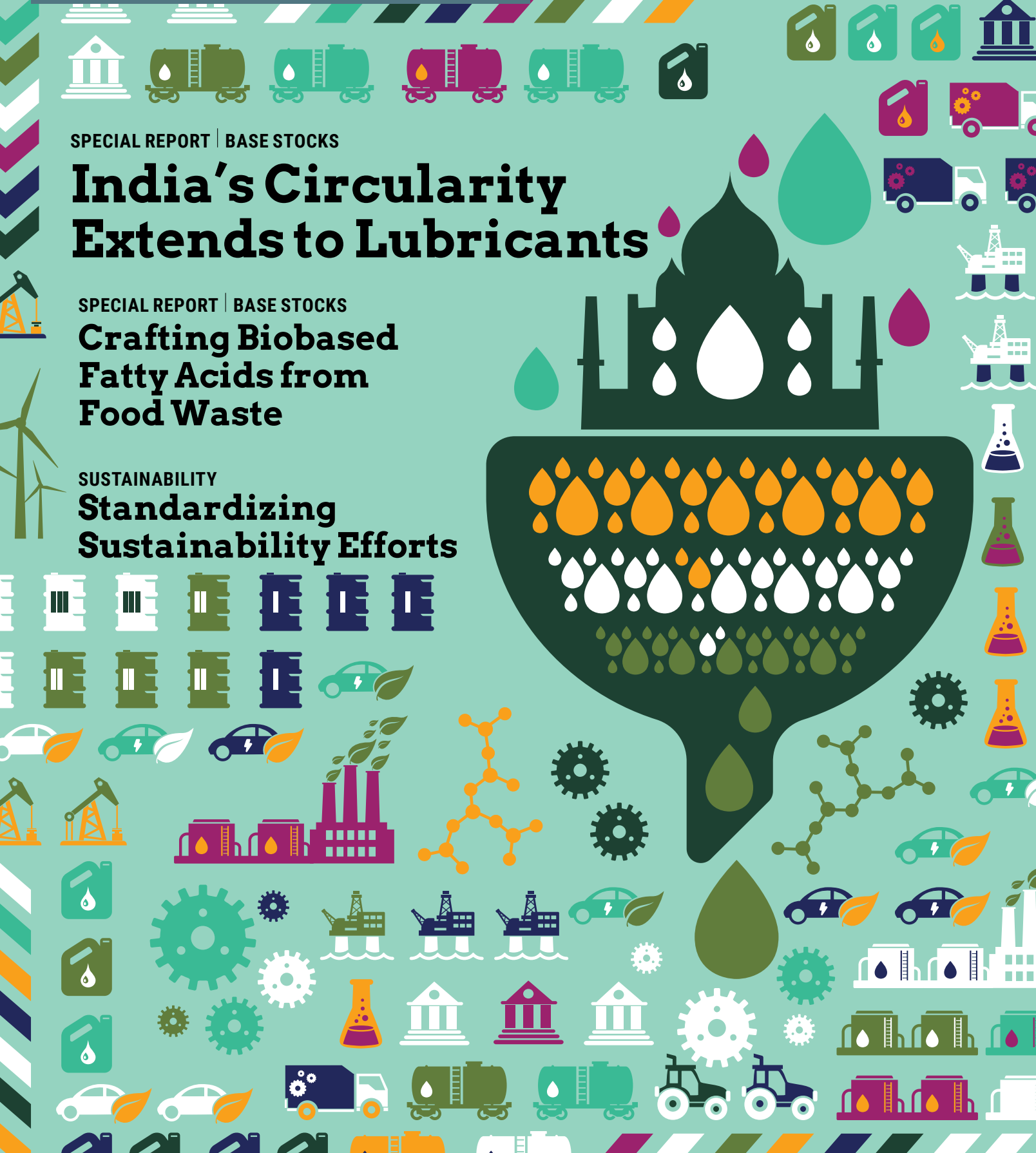
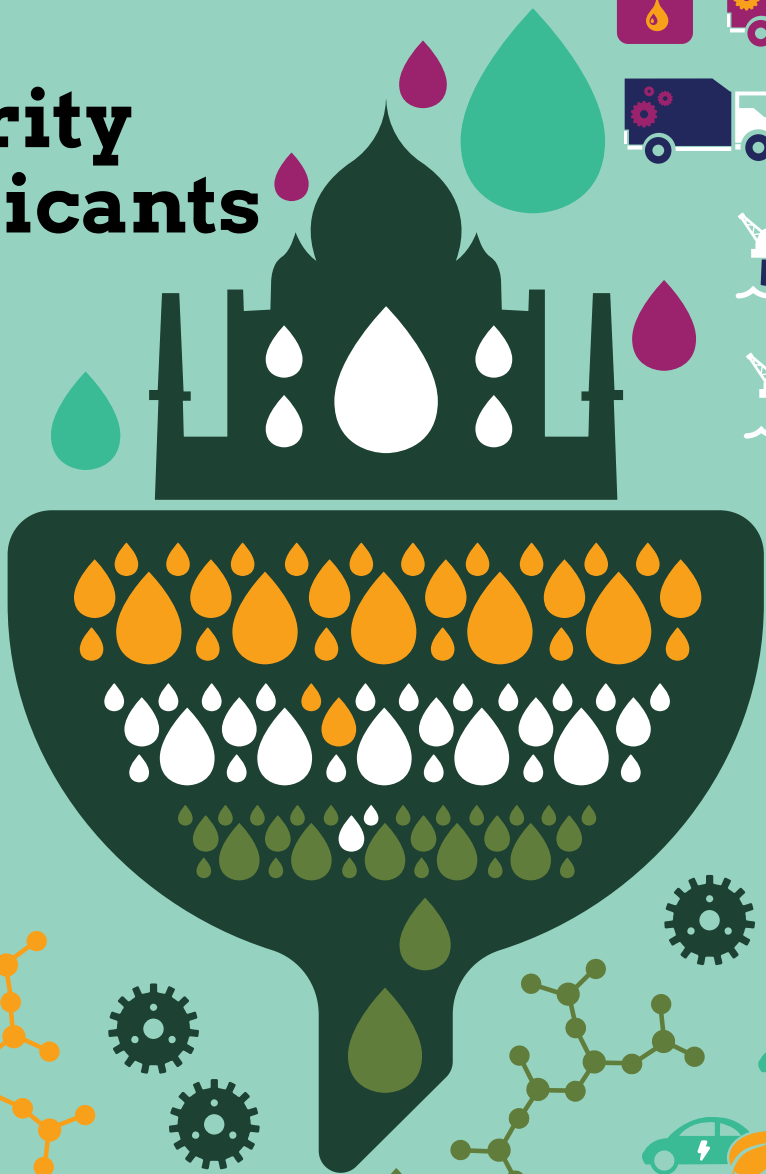
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SYDNEY MOORE
 is managing editor of
Lubes'n'Greases magazine.
 Contact her at Sydney@LubesnGreases.com

A Legend Is Lost

It is with much sadness that I announce that *Lubes'n'Greases'* beloved automotive columnist Steve Swedberg passed away on December 28, 2023.

Steve began his journey with *Lubes'n'Greases* in March 2007 as a guest automotive editor. Just a few months later, he made his position permanent. Steve's column was published monthly until 2020, at which point his columns appeared every other month. He published his last column in the December 2023 issue.

Before joining the *Lubes'n'Greases* team, Steve worked as product director for Pennzoil Products Co. for more than 17 years. He then

became market manager for Chevron Oronite in October 1996 and remained in that role for nine years before entering the consulting space.

Anyone who had the pleasure to work with Steve regarded him very highly. He possessed a deep knowledge of the industry and was active in industry organizations such as the American Chemical Society. One of his peers in the industry referred to Steve as "a mentor to many and one of the very few folks that could tie

the past with the present."

While Steve undoubtedly made his mark on the lubricants industry, I believe that his true legacy was his unwavering kindness and positivity. As his editor for nearly three years, I had the opportunity to learn from and interact with Steve on a regular basis. I looked forward to his phone calls and emails because he radiated happiness, and it was contagious. He was a top-tier colleague and an even better human, and his absence will be felt deeply.

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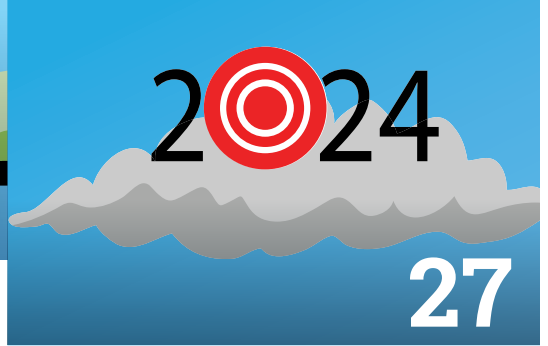
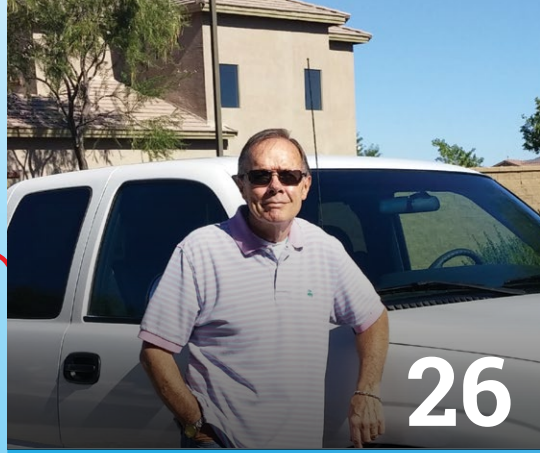
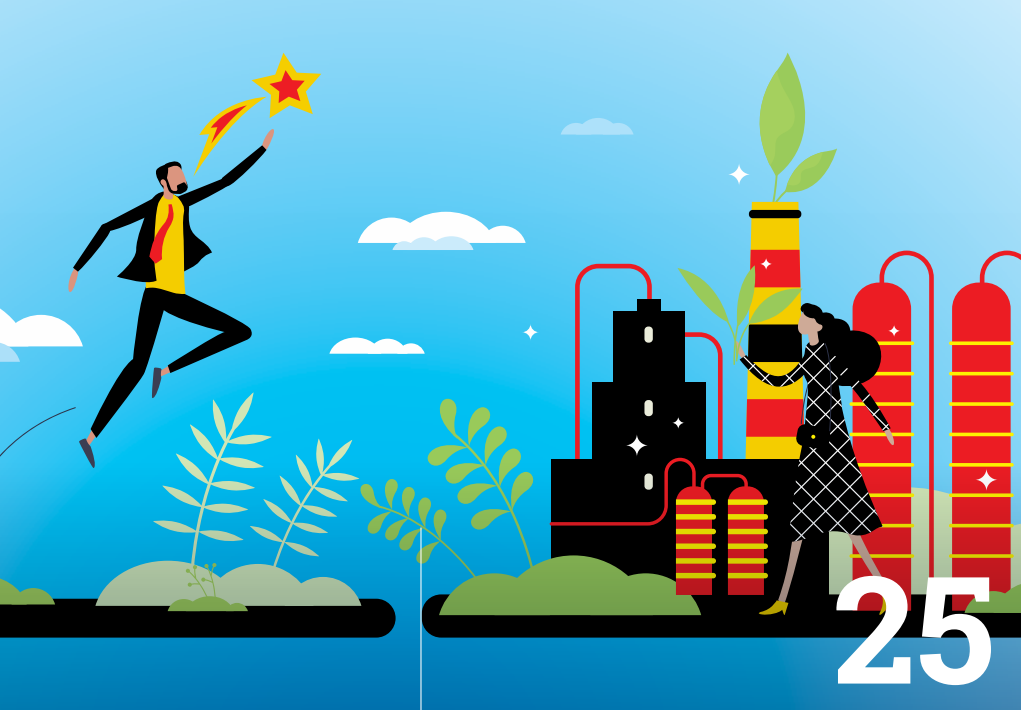
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BASE STOCKS | NORTH AMERICA

Dragon Days

According to the Chinese horoscope, 2024 is the year of the dragon. Although this legendary creature often conjures up images of fear and destruction, the year of the dragon is believed to bring prosperity and good fortune.

After months of lackluster market fundamentals in 2023, it would be opportune if the favorable qualities associated with the dragon were to infuse the base oils and lubricants industries this year.

The first week of 2024 ushered in fresh posted price decreases, with SK Enmove communicating that it would lower its Group II+ and API Group III base oil postings by 30 cents per gallon on Jan. 1. This followed announcements by Motiva and Petro-Canada that they would adjust down their Group II+ and Group III cuts with the same effective date, completing a series of decreases that had been implemented since December.

A majority of producers and re-refiners lowered their posted prices in late November and early December, with Group I grades going down by 20 cents per gallon and Group II grades by 15, 30, 35 and 50 cents. Group II+ prices fell by 10, 15, 25 and 30 cents. Most Group III cuts were decreased by 30 cents on Jan. 1, but SK also adjusted its postings down by 15 cents on Dec. 1.

With demand showing a pronounced slowdown ahead of Dec. 31, spot prices gradually lost ground because suppliers tried to encourage domestic sales as well as export transactions, with contract negotiations expected to yield deeper



GABRIELA WHEELER
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discounts over posted prices than in previous years.

Group I and Group II supplies were deemed plentiful to meet domestic demand, while export business into Mexico eased due to stricter import requirements on refined products.

Brazil continued to show strong interest in U.S. cargoes following an extended turnaround at a local refinery and an unexpected shutdown at a second facility. Brazil was anticipated to import additional naphthenic base oils as a domestic unit was preparing to shut down for maintenance.

U.S. Group II suppliers were still pursuing opportunities into more dis-

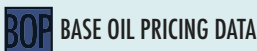
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Base Oil Report

February 2024

Base oil prices are lowest U.S. postings of the month for mid-vis grade before applicable discounts. Crude prices are monthly averages.

Historic and current base oil pricing data are available for purchase at www.BaseOilPrices.com

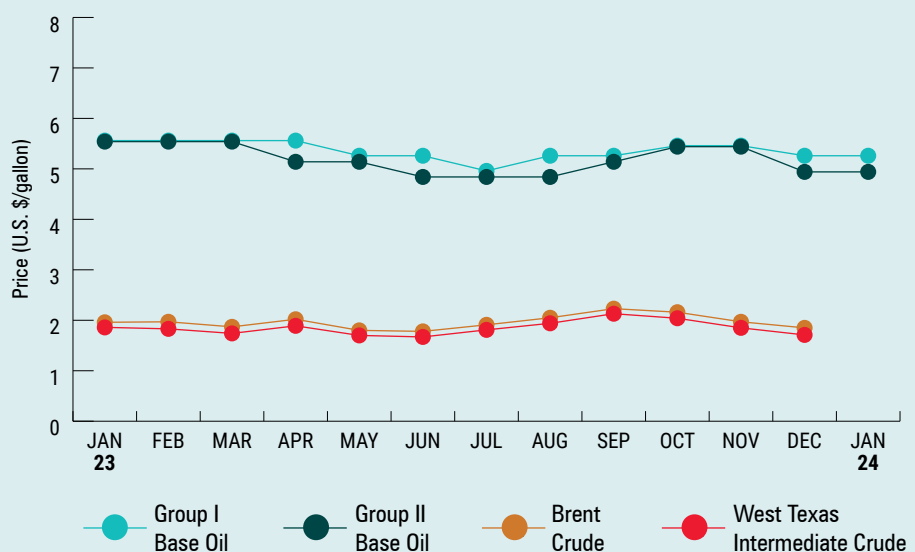


Sources: Lubes'n'Greases research, U.S. Energy Information Administration



VIDEO

Watch Gabriela & Sydney discuss this month's Base Oil Report





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FEBRUARY BASE OIL REPORT

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tant destinations like India, but the market there was ostensibly saturated, as several cargoes were expected to arrive in January, and demand was not particularly robust, with buyers relying heavily on domestic production and imports.

There was still heightened concern surrounding Iran-backed Houthi militants' attacks on commercial vessels in the Red Sea, which forced shipping companies to reroute their ships around the southern tip of Africa. This resulted in extended transit times and increased insurance and freight rates.

For Group III base oils, buyers and suppliers worried that product shipped from the Middle East would be prevented from reaching the Americas or would incur higher prices, but Asian shipments were anticipated to continue unabated, although general demand was lackluster and some shipments faced delays in the Panama Canal.

Lubricant manufacturers struggled to recoup base oil price increases implemented in August and September 2023 and communicated increase initiatives of their own for late October and early November implementation. However, the most recent base oil price decreases have lifted some of the upward price pressure and allowed some finished product suppliers and distributors to leave prices unchanged or grant small discounts to protect market share.

On the naphthenic front, similar fundamentals to those observed in the paraffinic segment prompted price decreases of 15 cents and 20 cents per gallon in mid-December to early January. San Joaquin Refining did not change the price of its transformer oils.

While naphthenic demand also showed signs of slowing, it seemed more balanced against supply than

the paraffinic side, with the light grades described as tight. This was partly attributed to planned and unplanned production shutdowns at naphthenic facilities in the third quarter, along with healthy demand from the export segment.

Naphthenic producer San Joaquin Refining completed a scheduled turnaround at its Bakersfield, California, refinery in early December but shut down the plant again due to technical issues with equipment installed in the hydrotreater. The producer resumed operations in the last week of December and hoped to be able to fulfill its backlog of orders in January.

Aside from sluggish demand, base oil prices came under pressure given falling crude oil and feedstock values. Some refiners continued to favor the production of base oils versus competing fuels due to more favorable margins, and this exacerbated the oversupply conditions.

Crude oil futures were volatile at the start of the year and initially jumped on concerns about Middle East supply disruptions after a U.S. helicopter repelled Houthi attacks in the Red Sea and Iran seemed to escalate its involvement in the altercations. News of an economic stimulus plan in China also boosted prices, as it was expected to result in increased crude demand in the world's top oil importing nation. WTI February futures were near \$75 per barrel at the end of December and hovered in the low \$70s per barrel in early January.

Crude oil and feedstock values and macroeconomic concerns impacting lubricant and finished products consumption are likely to be the main factors affecting base oil activity in the first quarter. Hopefully, the market will tip toward the benign qualities associated with a dragon year, rather than the negative connotations of the mythical creature. ♦

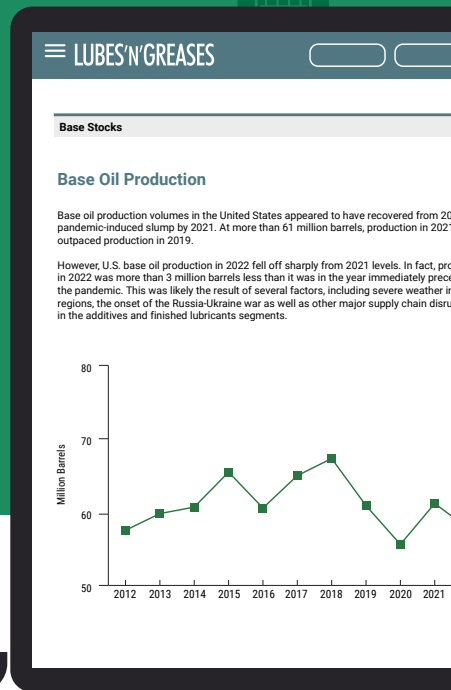
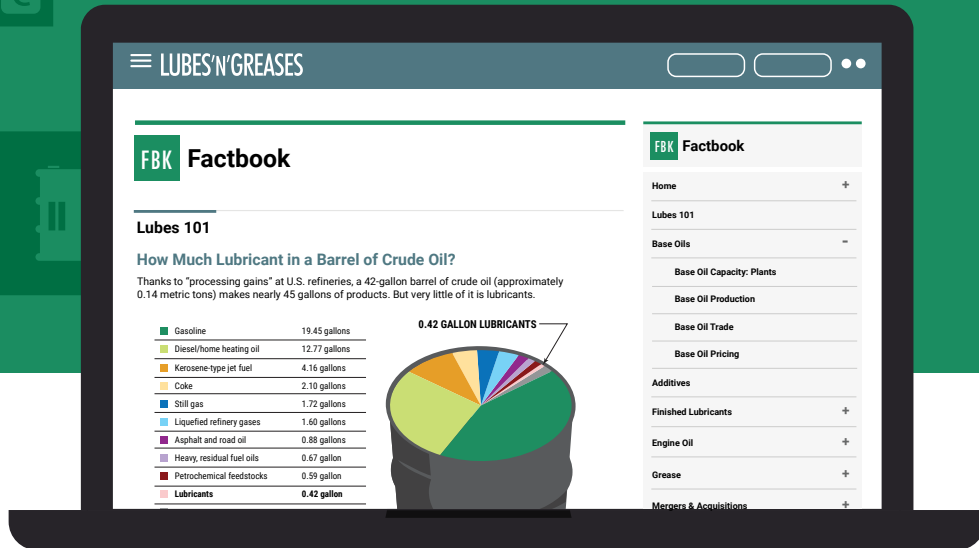
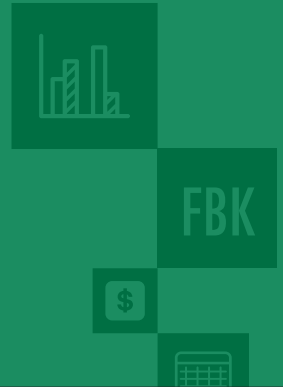
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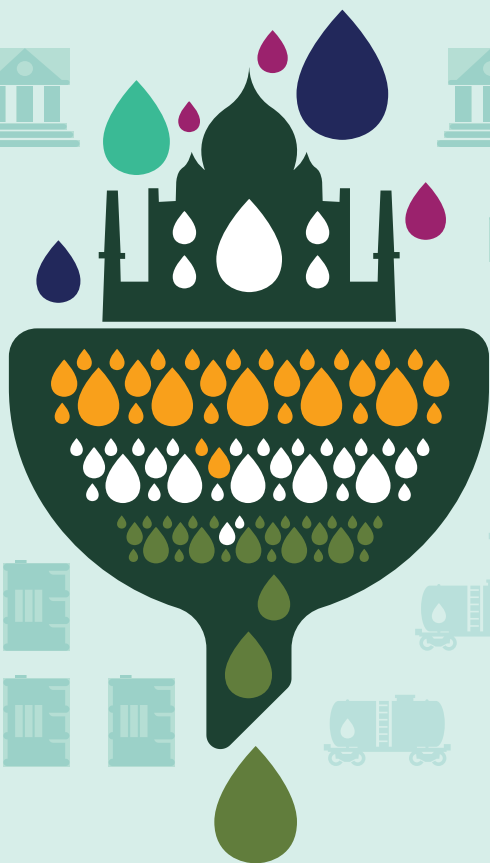
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By Trevor Gauntlett

India's Circularity Extends to Lubricants

India is expanding the scope of Extended Producer Responsibility to used oils from April 1, 2024. During consultation in 2023 and immediately after the legislation was published, concerns were expressed about the pace of change, some of which were scaled back. With implementation on the near horizon, Trevor Gauntlett asks whether there are likely to be issues facing those active in the Indian lubricants market.

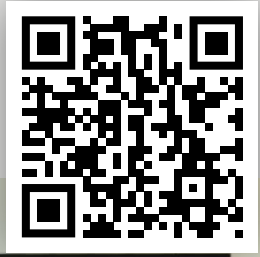
India's Extended Producer Responsibility (EPR) for used oils continues a process that since 2016 has encompassed e-waste, plastic waste, batteries and tires. Following 60 days of consultation in mid-2023, the final legislation was issued in September, creating the "Hazardous and Other Wastes (Management and Transboundary Movement) Second Amendment Rules, 2023."

Often referred to as "the Rules," the details of the amendment place an EPR on all producers, collection agents, recyclers and used oil

importers. However, exactly how far that responsibility extends has been open to debate. What's more, doubts have been expressed that the domestic rerefining industry will be able to cope as the volumes for which the EPR applies increase from 5% of all collectable rerefined products in fiscal 2024-2025 to 50% in 2030-2031.

While collectable and rerefined are not defined in the Rules, it is generally understood that these exclude greases, which cannot be

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rerefined, and process oils, which are consumed in, say, rubber manufacture and cannot be collected.

Capacity

“India is the third largest finished lubricant market in the world behind the United States and China, with a total demand of around 3 million tons spread across Automotive, Industrial and Process Industries,” Kedar Gore, a partner at Rosefield Energy Tech Pvt Ltd., based in Mumbai, India, told *Lubes’n’Greases*.

According to Kline & Co. in a presentation to the Asian Lubricants Industry Association (ALIA) in November 2023, rerefining companies in India have a theoretical capacity to produce rerefined base oils (RRBOs) of around 1 million tons. In theory, this is sufficient volume to meet

“As additional high-performance base stocks make their way into finished lubricants, more of them will also end up as a main component of the used motor oil that is collected to feed the rerefinerries, thus enhancing the quality of output.”

– GABRIELA WHEELER
LUBES’N’GREASES

the rerefining requirements in the first few years while those rerefiners or new players invest in upgrading their technology.

But that theoretical capacity is not matched by production capability. Kline pointed out that only 27 kilotons of RRBOs were produced in India in 2022—less than 1% of total lubricant sales that year.

The capacity is also widely dis-

persed. There are more than 400 rerefiners in India, according to Arijit Basu, managing director of Tide Water Oil Company (India) Ltd., based in Kolkata, which markets the Veedol brand, one of the leading privately owned lubricant brands in India.

Rosefield’s Gore expects this to change, as much—probably most—of the collected used oil is currently

Staff from Tide Water Oil Co. (India) receive an award for Sustainability Initiative at the Rosefield Conference for Lubricants & Fuels in Dec. 2023. Kalpendra Rajurkar (second from right) and Arijit Basu (right).



consumed as fuel. Once producers are required to engage with licensed collectors and those collectors are required to engage with the rerefiners, then volumes flowing into the rerefineries will grow quickly.

Quality

Unlike earlier chapters of the EPR legislation, which dealt with solid wastes, there is no mention of use of RRBOs. "This is an acknowledgement by the committees that advised on the legislation that the rerefining process is a capital- and technology-intensive process," Gore said.

However, during consultation on the draft legislation, end users expressed concerns about the quality of RRBO currently being produced by the Indian rerefining industry. Much would be described as a medium- to lower-grade API Group I base oil, with a relatively low saturates level and high sulfur.

While some of this is a function of the technologies deployed in the rerefining industry, Gore does not see this as the critical issue for the short term. "A lot of quality issues with current rerefined base oils are due to the variable quality of the used oil delivered to the recyclers," he said. Once volumes of used oil entering the rerefineries increase and segregation processes improve, he is confident that the quality of output will improve.

This is echoed by Gabriela Wheeler, base oil editor for *Lubes'n'Greases*. "The Indian government has made concerted efforts to improve the country's air quality by implementing mandates that require new vehicles to meet stricter fuel economy and emissions standards," she said. As a result, "automotive lubricants will have to incorporate greater quantities of [API] Group II

and Group III base oils. As additional high-performance base stocks make their way into finished lubricants, more of them will also end up as a main component of the used motor oil that is collected to feed the rere-

fineries, thus enhancing the quality of output."

Making it Work

Companies that produce, collect, recycle or import used oil must each

The advertisement features a large photograph of an industrial refinery facility with several tall distillation columns and complex piping. The background of the image is a light blue and white geometric pattern. The text "Empowering Progress" is at the top, followed by "BAPbase® Premium Quality Group III Base Oils". At the bottom, there are social media icons for LinkedIn, Instagram, YouTube, Facebook, and Twitter, along with the website "Bapco.net".

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register with the Central Pollution Control Board (CPCB). Any company active in more than one of those market segments must register for each segment. The CPCB is expected to create a portal through which all EPR certificates for used oil will be generated and traded from the implementation date.

“The intention is that all used oil will be traceable,” Gore said.

From 2024, importing used oil will only be permitted for the purpose of rerefining, and used oil importers will only be allowed to import the same volumes as the previous year. Implicitly, therefore, 2022-2023 defines the maximum import year for used oil.

With around 5% of the finished lubricants market, Tide Water ranks as one of the larger independent lubricant manufacturers. “Sustainability is extremely important to Tide Water and the Veedol brand,” said Kalpendra Rajurkar, general manager, Technology & Technical Services at Tide Water. “We are making serious efforts to lead on sustainability, including use of clean energy and room temperature blending, robotics in operations, digitalization and the development of products of low environmental impact, based on bio-sources and RRBOs.”

Rajurkar pointed to Sustainability awards recently collected by Tide Water from Rosefield Energy Tech and ASSOCHAM (the Indian associa-

tion of Chambers of Commerce and Trade Associations).

“Tide Water is now using 30% recycled plastic in lubricants packaging, with a target for 50% by the end of 2025 and 100% as soon as is feasible,” Rajurkar explained. “As a responsible company, we will make our best efforts to collect used oil and send through authorized collectors for the rerefining in view of EPR compliance.”

Franchised workshops should provide the first reliable tranche of used oil for recycling. These facilities are maintained to international standards, and used oil is already collected to be disposed of in a way that does not harm the reputation of the OEM. Thus, there should be few, if any, changes to working practices required to ensure appropriate segregation of contaminated waste oil from recyclable used oil. Administrative hurdles, such as ensuring the collector is properly licensed and that they follow the legislation in delivering the used oil to a licensed recycler, are also small.

Major industrial concerns such as steel, mining, utilities, manufacturing, shipping and railways, are sources of large volumes of used oil where the implementation steps are probably relatively simple. Indeed, an issue for the lubricants suppliers is that most of their major business-to-business customers fall into these categories and are classified

as bulk generators under the EPR legislation. This might then leave lubricants marketers chasing the higher hanging fruit from the start.

RRBO Use?

There is no mention in the Rules of usage of RRBO in finished lubricants, but in late 2023 there was some alarm, as it was reported that the Indian Government was mandating that 5% of rerefined base oils be used in all products from Day 1. This would have created a requirement for more RRBO than is currently available on the Indian internal market, with the prospect of an overnight switch and the knock-on effects on both the virgin and RRBO markets.

“The Second Amendment Rules are purely about collection and recycling (rerefining) of used oil,” Gore said. Although, collection and rerefining will create API Group I quality base stocks that were previously unavailable.

Anticipating that the Rules will be amended at some time to require use of RRBOs, Rajurkar explained that “Tide Water has well-advanced development programs for products utilizing RRBOs and has already taken steps to source good quality RRBO for use in products.”

There is a wider issue around the ability of the Indian market to absorb up to 50% of base oil volume as Group I in the early 2030s, when projections call for increasing market share of Group II or Group III oils. “Approximately 60% of India’s base oil demand is fulfilled by imports, with large Group II and Group III base oil volumes secured each month from within Asia, the Middle East and the U.S.,” Wheeler said.

State-owned producer Indian Oil Corp. Ltd. (IOCL) plans to add 1.28 million tons per year of Group II and Group III capacity at three

“Making it work will involve significant investment in managing all operations, including appropriate containers, specialized vehicles and trained personnel to handle the used oil safely.”

— ARIJIT BASU
TIDE WATER OIL CO. (INDIA)

of its refineries by 2027. Although there are market projections that India will only be importing Group II and Group III base oils by 2030, the country currently still needs to import Group I and is operating at least three domestic Group I base oil plants.

Wheeler conjectured that “RRBO, together with the production from the existing conventional Group I base oil plants, will likely allow India to become largely self-sufficient in terms of Group I needs.”

Can it Be Achieved?

Beyond the franchised workshop and large industrial segments, the major challenge for India may be collection of any significant quantities of used oil having consistent quality. Rerefiners want secure, consistent

supply. Currently, any purchases of used oil from the small, informal collectors are priced like “spot” base oil purchases.

“Making it work will involve significant investment in managing all operations, including appropriate containers, specialized vehicles and trained personnel to handle the used oil safely,” Basu said.

“It is essential to form consortia dedicated to organizing the collection, sorting and distribution of used oil,” Gore said. “This will address challenges related to the quality, consistency and volumes, while preventing diversion of used oil to unauthorized purposes, such as fuel adulteration. Establishing such consortia is crucial for ensuring the accurate pricing of used oil and facilitating rerefiners to align their prices

with the Rerefined Base Oil price, bringing it on par with virgin oil.”



TREVOR GAUNTLETT has more than 25 years’ experience in blue chip chemicals and oil companies, including 18 years as the technical expert on Shell’s Lubricants Additives procurement team. He can be contacted at trevor@gauntlettconsulting.co.uk



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By Sydney Moore

Brazilian Car Parc Drives Base Oil Demand

According to the Lubes'n'Greases Global Base Stock Plant Guide 2023, Brazil houses three major base oil plants and one rerefinery. Of those facilities producing virgin base stocks, only one outputs naphthenic base stocks, while the others produce mostly API Group I oils.

Below is a list of the major base oil plants in the country, along with their ownership and production capacities:

- The base oil plant at the Duque de Caxias Refinery, known as Reduc, is owned by state oil company Petrobras. The plant has annual Group I production capacity of 584,000 tons per year.
- The Lubnor base oil plant, also owned by Petrobras, is located in Fortaleza, in the northeastern state of Ceara. Formerly named Refinaria Lubrificantes e Derivados do Nordeste, or Northeastern Lubricants and Derivatives Refinery, it has 68,000 t/y annual naphthenic base stocks production capacity.
- The base oil plant at Mataripe Refinery in Sao Francisco do Conde is owned by Mubadala Investment

Co. and operated by its Acelen subsidiary. Its annual Group I production capacity is 91,000 t/y.

- The rerefinery in Lencois Paulista is owned by Lwart. It currently has capacity to produce 1,550 barrels per day of rerefined Group II base oils, but the company is reportedly planning an expansion of the plant's capacity.

Brazil's base oil producers do not currently make enough volumes to support its appetite, and the country has been reliant on imports, mostly from the United States, for some time. In fact, while it may be too early to make any definitive conclusions, it appears that Brazil's domestic base oil production is slipping, while import activity in the country is consequently ramping up.

From January through November

last year, Brazil's base oil production declined 11% to 416,000 tons, compared to 467,000 tons the year before. Meanwhile, Brazil's base oil imports during the same 11-month period rose 6% to 750,000 tons, compared to 705,000 tons in 2022.

The Brazilian Car Parc

At nearly 38 million passenger vehicles, Brazil possesses the first largest car parc in South America and the sixth largest in the world. Furthermore, the country is the eighth largest vehicle producer in the world—it output about 2.4 million units in 2023—and the seventh largest market for new vehicle registrations.

Not surprisingly, the vast majority of vehicles in the country are powered by internal combustion engines (ICEs).

Continued on Page 20

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SPECIAL REPORT | BASE STOCKS

Continued from Page 18

While alternative technologies, such as hybrid electric vehicles and battery electric vehicles, are expected to increase in popularity in the country in the coming years, industry experts predict that the country's car parc will remain largely ICE-powered for some time.

Notably, about 75% of the passenger car fleet in Brazil is powered by "flex" internal combustion engines, Iconic Base Oil Executive Manager Marcelo Guimaraes told attendees at the ICIS Pan-American Base Oils and Lubricants Conference held in Jersey City, New Jersey, in early December last year. This means that the owner of the car has the choice to fuel it with gasoline or ethanol.

Base Oil Demand Shifts

Brazil's growing car parc as well as advances in vehicle technology have necessarily reshaped base oil demand in the country over the past few years, and this is a trend that many industry players believe is likely to continue.

In fact, Iconic's Guimaraes expects Brazil to steadily increase its appetite for Group II and Group III base stocks over the next few years. He attributed this looming shift to a rise in automobile production, more stringent emissions regulations as well as a need to increase the supply of premium lubricants in the country to meet the

demands of newer engine technology. Meanwhile, Group I demand is forecast to recede.

Of course, it would be difficult to understand base oil demand dynamics in Brazil without also understanding the finished lubricants landscape. So who are the major players in the country? Which types of products are needed most? And how does all of that affect current and future base oil demand?

Lubricant market share in Brazil is distributed fairly unevenly. Nearly two-thirds of lubricant volume is dominated by the country's major players. These include suppliers like Iconic, Vibra, Moove, Petronas, Shell, Castrol and Total. The remaining 35% of market share in Brazil is distributed among the smaller players, both local and international.

With such a large vehicle population, the activities of the lubricant marketers in the country are primarily focused on meeting the needs of the automotive industry. Lubricant products geared toward passenger cars and motorcycles account for more than a quarter of the market (27%). Not surprisingly, industrial applications follow closely at 24%, then heavy-duty diesel applications at 23%, driveline fluids at 22% and non-segmented applications at 4%.

As new cars replace old ones and overall engine technology in the country becomes more sophisticated, growing demand for

6.3%

Growth in Brazil's demand for Group II base stocks in 2023

premium automotive lubricants is likely to bring about an increase in requirements for higher-performing base oil grades. As mentioned above, Brazil's domestic base oil production consists mostly of Group I oils and a very small portion of Group II base stocks. The country imports significant volumes of Group I base oils, even larger volumes of Group II cuts and some, albeit not as many, Group III grades.

The majority of base oil imports are purchased and used by the five largest lubricant manufacturers, Guimaraes said.

By the end of 2023, Brazil's demand for Group I base oils grew by 0.6%, while Group II soared by 6.3% and Group III by 4.8%, Iconic estimated. In the next four or five years, Group I demand will likely remain flat, Group II demand will grow quickly, and Group III consumption will likely keep pace.

Adherence to newer heavy-duty engine oil categories may also affect base oil demand in Brazil. Some lubricant producers in the

4.8%

Growth in Brazil's demand for Group III base stocks in 2023

country use Group I base oils to manufacture API CI-4 lubricants. However, a shift from CI-4 to CK-4 oils "means that Group II base oils will need to be used," Guimaraes said.

Looking into the future of the base oils and lubricants industry in Brazil, Guimaraes projected that lubricants produced for ICE-powered equipment will last longer than they will in regions that are expected to adopt electric vehicles at a quick rate (e.g., China, the United States and countries in the European Union). Other progress will still be made to meet lower emissions goals, but there are likely some major advances ahead for automotive lubricants that will inevitably affect the country's base oil landscape.

"Base oils have the most to contribute to the upgrade of the Brazilian lubricant market," Guimaraes said. ♦

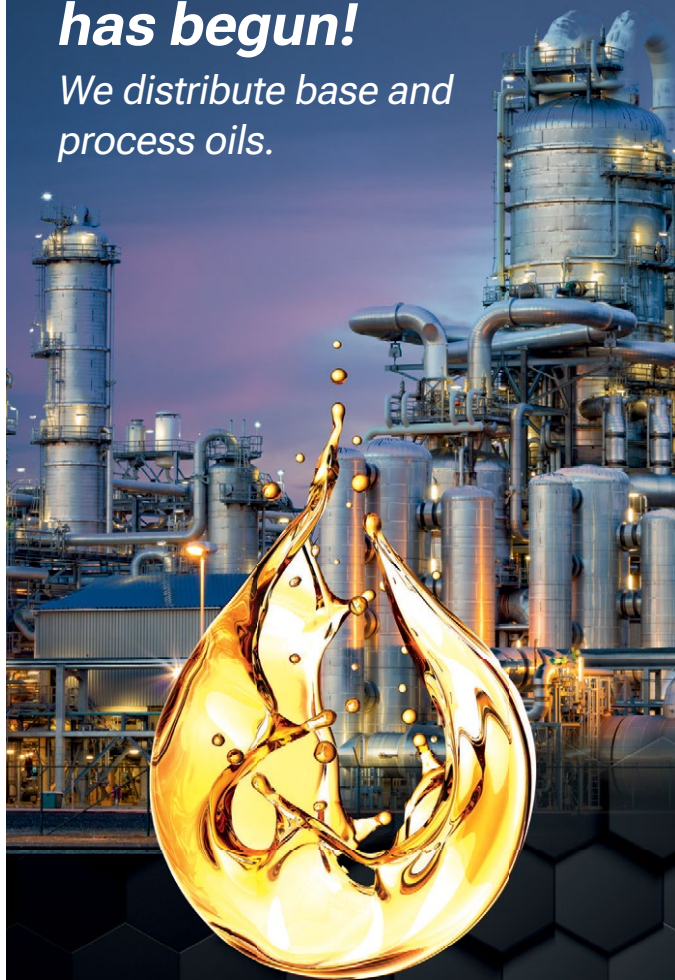
Gabriela Wheeler and George Gill contributed to this article.

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By Boris Kamchev

Crafting Biobased Fatty Acids from Food Waste

The Dutch chemicals startup ChainCraft has positioned itself as a company that operates in the biobased economy. Its products, masterminded at its pilot plant in Amsterdam, are “safe and sustainable chemicals” used in several applications and industries, including lubricants.

What is meant by the term biobased economy?

“The biobased economy concerns the transition from an economy that depends on fossil raw materials into an economy using biomass as a raw material,” explained a Chaincraft official.

In the case of ChainCraft, this biomass can range from “sugar molasses” to “cabbage cores,” meaning any type of plant-based source primarily coming from food waste. The company employs traditional fermentation in producing its chemical products from this biomass.

“We are not producers of [mineral] oil esters; however, we do enable more sustainable polyester production by providing more sustainable fatty acids,” Jeroen van Dorp, the com-

pany’s commercial manager, said at ACI’s European Base Oils and Lubricants conference held in Barcelona in November.

“ChainCraft’s unique and patented solution is based on a three-step process using non-GMO ‘mixed culture fermentation’ and downstream processing to create mixed medium-chain fatty acids and their fractionated pure products,” van Dorp said.

Fatty acids, in combination with alcohols, make widely used polyol esters. The lubricant industry’s use of esters has grown steadily for the past few decades as synthetic base stocks have become more popular.

Beyond Chemistry

In traditional chemistry, fatty acids come through chemical synthesis and

can be made from petrochemicals or materials derived from plants or animals. Some of the more common plant sources are palm, rapeseed, canola and soybeans, most of which are also food sources.

While these sources are renewable, van Dorp emphasized that there is a significant environmental risk present when large-scale industries—including food, pharmaceutical, cosmetics or lubricants—use fatty acids derived from petrochemicals or plant sources.

“First of all, petrochemicals cause greenhouse gas emissions and environmental devastations, while the use of palm oil results in biodiversity loss and climate impact,” he said.

In a sort of knock-on effect, van Dorp posited that deriving fatty acids from these sources has dire consequences and can even “violate human rights.”

The United Nations agrees. In fact, the organization has stated that climate change pushes beyond the bounds of environmental concerns and into the realm of human rights, as people living in many regions across the globe have been victims of increasingly frequent natural disasters caused by the changing climate, such as tornadoes, floods, hurricanes and wildfires.

“Climate change threatens the effective enjoyment of a range of human

rights, including those to life, water and sanitation, food, health, housing, self-determination, culture and development,” said the UN’s Office of the High Commissioner for Human Rights. “States have a human rights obligation to prevent the foreseeable adverse effects of climate change and ensure that those affected by it, particularly those in vulnerable situations, have access to effective remedies and means of adaptation to enjoy lives of human dignity.”

Waste No More

ChainCraft sees a potential solution to the fight against climate change: the production of chemicals from waste. This endeavor is aligned with the global trends of the circular economy, sustainable development and the transition to renewable sources of energy, such as wind and solar.

At its climate change Conference of the Parties (COP28) in Dubai, the United Nations announced on December 13 that an agreement was made “that signals the beginning of the end of the fossil fuel era by laying the ground for a swift, just and equitable transition, underpinned by deep emissions

cuts and scaled-up finance.”

In line with this, van Dorp said that now “is the right time to start product development for new polyol esters based on circular caproic acid.”

Like hundreds of like-minded chemical companies, ChainCraft has aligned itself with the European Union’s “Fit for 55” plan for green transition. Fit for 55 aims to reach the EU’s goal of reducing emissions in the bloc by at least 55% by 2030.

ChainCraft stated that its products must be made in a biobased circular economy powered by renewable carbon. They should also be derived from local sources and have a stable supply from non-genetically modified food waste.

“These new waste-based fatty acids bring three key benefits,” van Dorp said. “They are not only sustainable but have a three to six times lower carbon footprint. They are more stable in supply and price, and can provide functional improvements, such as high viscosity as well as high polarity and stability.”

Processes and Products

The non-GMO organic residues

from any plant-based food sources are processed through mixed-culture fermentation, van Dorp explained. The process includes three steps.

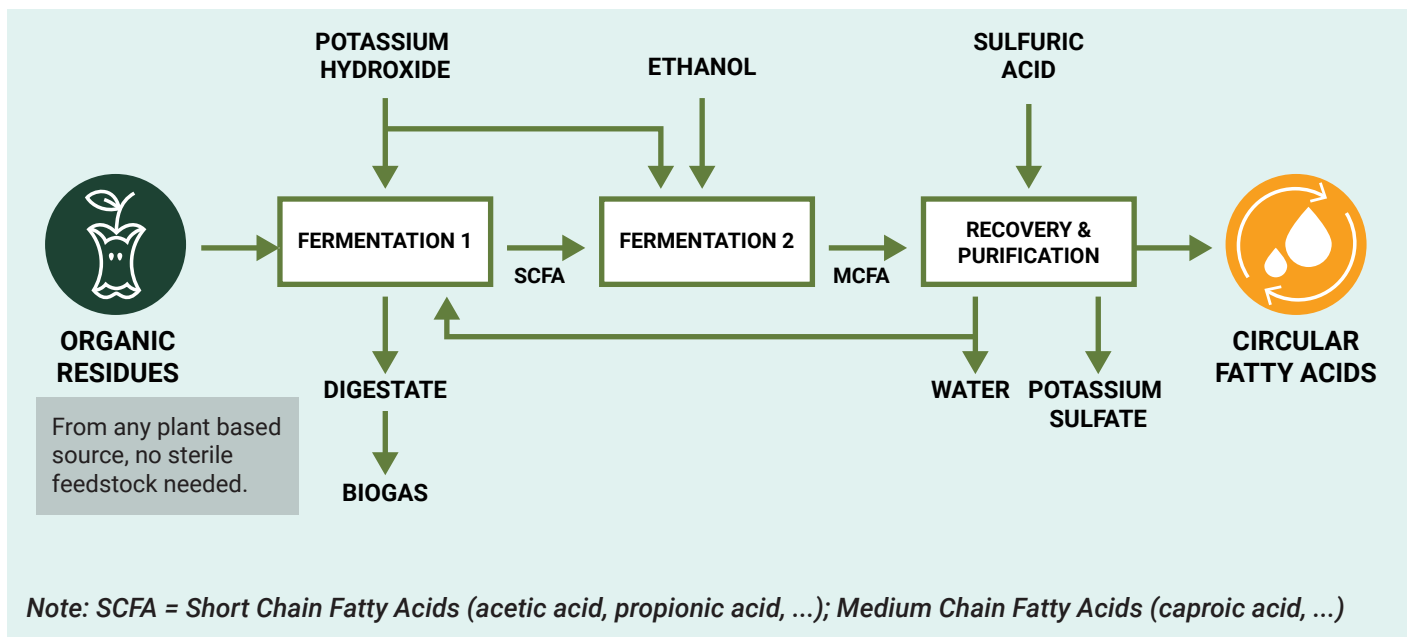
In the first step, hydrolysis and acidification occur with the use of potassium hydroxide, resulting in short-chain fatty acids. These are then fermented in a second stage involving chain elongation and the use of ethanol, resulting in medium-chain fatty acids. Finally, the fatty acids are recovered and purified using sulfuric acid, with “circular” fatty acids as the final, marketable product. During this process, biogas, potassium sulfate and water are the byproducts.

ChainCraft’s products include four to eight grades of X-Craft-branded caproic, butyric, valeric, heptonic, and caprylic acids. The company says that it is “ready to enable production of fully biobased polyol esters eligible for an EU Ecolabel.”

The X-Craft product line “is developed for the chemical industry and is perfect for synthetic base oil production,” the company said. “Higher purity grades will be available upon request. In addition, a novel class of low-viscosity lubricants can be made

Figure 1. Our proprietary fermentation process

ChainCraft’s unique and patented solution is based on a three-step process using non-GMO ‘mixed culture fermentation’ and downstream processing to create the mixed MCFA and their fractionated pure products.



Source: ChainCraft



An aerial view of ChainCraft's demonstration facility at the Port of Amsterdam. Photo courtesy of ChainCraft.

from biobased caproic acid as an innovative new ingredient."

ChainCraft indicated that these potential low-viscosity and energy-efficient specialty lubricants will have good thermal and oxidative stability. The finished lubricants might also boast a low carbon footprint and biodegradability.

Timing

"The mission of ChainCraft is an industry where all chemistry is circular," van Dorp said. "This is ambitious and visionary, and the company hopes to achieve it soon."

Using diverse state and European Union funding, ChainCraft opened a small demonstration facility located in the Port of Amsterdam. It has the capacity to produce 2,000 tons per year of fractionated, single-cut fatty acids using its proprietary fermentation process. The pilot plant can produce C4 to C8 grades of fatty acid salts.

Van Dorp added that the company is just starting its product development and appealed to investors to help the industry in this transition.

The company is actively exploring various venture capital funds, with the

aim of scaling up its pilot production toward full scale. This includes the construction of a 30,000 t/y "ChainCraft flagship plant" to be located "in or around the Netherlands or Western Europe."

Van Dorp mentioned that he cannot reveal the exact location because the company is working toward an agreement with partners. The plant is scheduled to launch its operation in 2026 "with a sustainable supply of fractionated, single-cut fatty acid products," the company said.

Cutting Carbon

The company conducted a life cycle assessment simulation of its planned 30,000 t/y fatty acids plant project using potato juice resources. The simulation shows the impact the plant could have on global warming by its carbon footprint. According to ChainCraft's calculations, the plant's footprint is 0.85 kilograms of carbon dioxide per kilogram of product when potato juice is the feedstock.

Using other widely available vegetable sources, such as coconut or palm oil, that impact would be above 4 kg CO₂/kg of product. With crude oil, the

impact would be 2.35 kg CO₂/kg of product.

Pricing Stability

Of course, it is no secret that synthetic base stocks can be much more expensive than their mineral oil counterparts. But ChainCraft has projected that the sustainability of its unique sources can improve the stability of fatty acid prices as well as supply. This is possible "because the waste is always available and is available at low price with minimal volatility," the company said.

Van Dorp added that the company's fatty acid pricing and availability depend on long supply chains. He explained that the traditional sources for fatty acid supply—such as coconut and palm kernel oils as well as crude oil—are typically challenged by price fluctuation and that the feedstock price volatility cannot be transferred to end-product prices. ♠



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SUSTAINABILITY | WORLD

Sprind 4 Sprint

Leap innovations fundamentally change an existing market, create a completely new one or solve a significant technological, social or ecological problem.

The Coronavirus pandemic demonstrated why we need leap innovations so urgently. Thanks to a groundbreaking technology, a vaccine was developed quickly. It protected millions of people from the severest cases.

New, world-changing ideas—such as the invention of the smartphone, GPS or the MP3 format—have been witnessed several times in the past and are now part of people's everyday lives.

To develop on this idea, the German government founded the Federal Agency for Disruptive Innovation, known as Sprind, on Dec. 16, 2019. It is modeled on the U.S. Defense Advanced Research Projects Agency.

Sprind promotes disruptive technologies and discovers and further develops research ideas with the potential to become leap innovations, to maintain competitiveness, and secure and create jobs and prosperity in Germany and Europe.

The agency works on behalf of the

Federal Ministries of Education and Research, and Economics and Climate Protection. It is initially planned to run for 10 years with funding of around €1 billion. Its supervisory board consists of 10 members from science, industry, ministries and politics.

On Nov. 17, 2023, the Federal Parliament passed the Sprind Freedom Act, which allows Sprind to decide on the establishment of subsidiaries or the acquisition of company participations. This makes the progression from idea to product faster and more flexible.

Innovators can submit project proposals directly to Sprind any time. Supported projects address a wide range of topics and challenges of our time in healthcare, climate and environmental protection, technological sovereignty and communication. They range from a novel Alzheimer's drug to a way to remove microplastics from water.

The agency thinks the best ideas often result from competition between bright minds. It uses challenges—



APU GOSALIA is a sustainability expert. He can be reached at apurva.gosalia@web.de

innovation competitions on social challenges—as an innovative funding instrument. The latest challenge is called Carbon-to-Value. It deals with the long-term removal and utilization of CO₂ from the atmosphere.

“In order to limit a serious rise in the global average temperature it is not enough to avoid and reduce future CO₂ emissions. We must remove a large amount of CO₂ from the atmosphere,” explained Jano Costard, a challenge officer at Sprind. “We want to help new processes achieve a technical and commercial breakthrough that remove CO₂ from the atmosphere and then store it in valuable products in the long term.”

The participants of the Carbon-to-Value challenge will receive up to €3 million by the end of this multi-year challenge on Sept. 30, 2024.

Sprind supports the entrants in the further development of their technologies and commercialization of their products not only financially but also with intensive coaching and contacts with private-sector investors. This ensures they also receive follow-up financing for their further growth.

Innovations are no longer limited to individual countries. To stay globally competitive, cooperation is essential. Sprind wants to bring together the most innovative minds from different countries as early as possible and network them internationally.

Creative ideas are the basis for revolutionary innovations, but the knowledge gained from research must be put into practice. Good ideas need a chance, sustainability needs good ideas and Sprind supports sustainability sprint.

STAY SuSTAYnable! ♠



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AUTOMOTIVE LUBRICANTS | WORLD

The End of An Era

Those of you that read the Editor's Letter on Page 3 know that *Lubes'n'Greases'* beloved automotive columnist Steve Swedberg passed away on December 28. While we mourn his passing, perhaps it is fitting to celebrate a life and a career that were, in a word, extraordinary.

Steve began working with *Lubes'n'Greases* as a "guest editor" in the magazine's April 2007 issue. With his extensive background and contacts in the lubricants and additives businesses—as well as his experience as a past chairman of the Society of Automotive Engineer's Technical Committee 1 on automotive engine oils—he had deep technical and market knowledge as well as the sincere respect of readers.

By July 2007, Steve was LNG's permanent automotive editor. In addition to his monthly column, he wrote more than 50 in-depth feature articles for *Lubes'n'Greases* magazine and covered breaking news about automotive topics for *Lube Report*.

"He was a knowledgeable and creative writer, a stickler for accuracy and curious about the world," said Lisa Tocci, LNG cofounder and original managing editor of *Lubes'n'Greases* magazine. "He was open to all kinds of topics for his column and for features, because he

was truly enthusiastic about automotive lubricants and wanted to share that enthusiasm with readers."

Like a lot of people in the industry, Steve believed that lubricants made the world a better place and deserved greater appreciation for their positive impact on consumers, the environment and the global economy. So let's take a look at some of Steve's best work and honor a colleague and friend who will be dearly missed.

The Beginning. Steve's first column as a permanent editor appeared in the July 2007 issue and discussed why lubricants' ability to improve fuel economy by even a small amount was a money-saving quality.

Not a Question Unanswered. *Lubes'n'Greases* readers often wrote to Steve with questions about automotive lubricants based on their own curiosity or something he had written in previous columns. He took the time to answer these questions individually but would also periodically write a column that

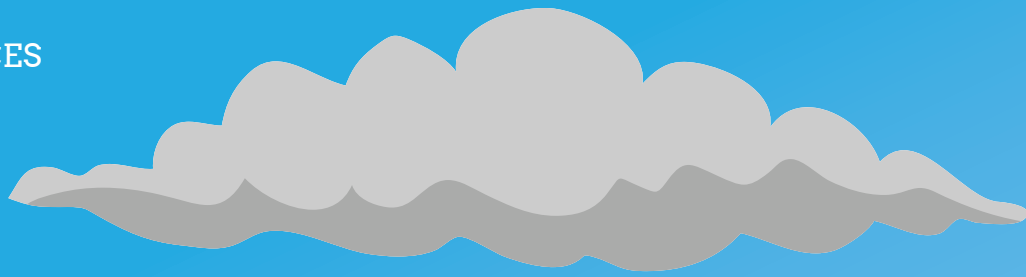

SYDNEY MOORE

is managing editor of *Lubes'n'Greases* magazine. Contact her at Sydney@LubesnGreases.com

would publicly answer some of the most thought-provoking questions he had been asked throughout the year. Check out the December 2020 issue to see which questions Steve thought were most pertinent during that tumultuous year.

Fifty Years of Engine Oils. In a column titled "The Last 50 Years" that appeared in the October 2013 issue, Steve reflected on the time he had spent working in the lubricants industry. The column explored changes that had occurred in base oils, additives, viscosities and even specifications during his tenure. It created a near-comprehensive timeline of the industry and brought the history of engine oils alive in the present.

The End of an Era. Steve's last column, which appeared in the December 2023 issue, was titled "The Hidden Side of Viscosity" and discussed what viscosity is and why it's perhaps the most important characteristic of engine oils. The column was an excellent example of Steve's ability to connect lubricants of the past with those of the present and the future. ♦



BUSINESS | WORLD

Address the 2024 Trends

As you put in place 2024 financial plans and objectives, it is a good time to consider the mega-trends that are affecting the world, especially those that may have a significant impact on the oil, lubricants and additives businesses. This article outlines some of these key trends, as well as ideas about what you can do to manage them in your business area.



Artificial Intelligence Grows in Importance

Last year was a breakout year for generative artificial intelligence, with the public release of ChatGPT and the ensuing efforts by others such as Microsoft and Google to provide products in that space. The stocks of companies such as Microsoft and Nvidia had tremendous gains in 2023 due to expectations that they will be among the winners in monetizing the AI potential. While undoubtedly there is some hype around AI, I believe this is an area of great opportunity as well as significant risk, and I recommend that your company put some effort into understanding both sides of this trend.

I suggest that in 2024 you develop an AI strategy for your company, with the help of knowledgeable consultants in the field. You may want to address risks first in order to ensure that your company systems remain

safe; however, the opportunities may be significant in the oil, lubes and additives business. For example, AI should allow better analysis and perhaps monetization of the large amounts of data that our businesses collect as well as improve the ability to formulate products with lower costs and reduced investment over time.

Actions to take in 2024: Consider the risks and opportunities associated with AI and start to develop your corporate strategy.

Global Risks Fester

In 2023, we saw the continuation of the Ukraine conflict as well as the start of the Israel-Hamas war. In addition, there was much talk of potential China aggression toward Taiwan and increasing political ties between China and Russia. Shipping companies are avoiding Red Sea routes due to Houti attacks, and there is worry about potential Iran actions

that could widen the current conflict. Notably, 2024 has been dubbed the biggest election year in history, as more than 60 countries representing half the world population will hold some sort of elections this year. Closer to home, we have the United States Presidential election in November, which will no doubt be consequential on many fronts.

Actions to take in 2024: Build an assessment of key global risks into your business strategies and plans.

Supply Chains are Rethought

The rethinking of supply chains began during the pandemic, but the urgency and magnitude of the issues may have prevented a more



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holistic and cogent redesign from taking place. I suggest you review your supply chain situation with a view toward reducing inherent risk. Consider risks associated with the geopolitical situation described earlier as well as risks due to climate change, potential new pandemics and financial security of your suppliers. Your suppliers and your customers are likely also doing this type of review, so be sure to monitor their actions as well. It may be that your actions to reduce risk will increase costs in the short to medium term, so be sure to factor this into your financial plans.

Actions to take in 2024: Consider de-risking your supply chains, starting with largest risk areas first.

Economies Slow but Don't Break

Many economists are now calling for a "soft landing" in 2024. Janet Yellen said in late November 2023 that she believes the U.S. economy does not need further drastic monetary policy tightening to stamp out inflationary expectations and was on track to achieve a "soft landing" with strong employment. The most recent "dot plot" from the Federal Reserve officials indicated a potential for three separate quarter-point interest rate cuts in 2024. The U.S. unemployment rate remains historically low, around 3.7%. The rate

of inflation has been falling fairly steadily all during 2023 in many developed economies. However, there are some warning signs, such as reduced growth in commercial loans and leases, reduced money supply in the economy, and higher credit card and loan delinquency. All of these pieces of information lead to the likelihood of a slowing U.S. economy in 2024 but one in which consumer demand will remain good.

Actions to take in 2024:

- Manage prices carefully as some costs may come down.
- Prepare for lower interest rates, especially in 2H24.

ESG: More Political but Increasingly Important

As you know, ESG stands for Environmental, Social and Governance, and there was a lot of buzz about these aspects of business management during the past few years. Early on, there was a frenzy of activity to get on the "ESG bandwagon" to ensure proper consideration by funding sources and other stakeholders, but in 2023 there was significant "ESG backlash." According to a recent study by the Conference Board, 48% of businesses have experienced backlash to their ESG policies or activities, with the majority of the backlash coming from policymakers and political can-

didates as well as employees. I believe the politicization is unfortunate, and I urge you to pay close attention to ESG-related aspects in 2024. Of course, you may wish to think about how you communicate with regard to ESG to make it more palatable for a wide spectrum of beliefs.

In particular, I draw your attention to the "G" in ESG, as we saw several public examples in 2023 of issues relating to governance. Sam Bankman-Fried was convicted last year of fraud and related crimes in connection with his former company FTX. In a previous article, I recounted how the company shockingly lacked suitable oversight for a company of that size and renown. Also, in November 2023 we saw the Board of the company OpenAI suddenly fire its influential CEO Sam Altman, then rehire him a few days later. Since that time, a new board has been put in place, but the ramifications of that public dispute are yet to come.

Actions to take in 2024:

- Review how ESG principles are being incorporated in company strategy and how progress toward goals is being measured.
- Consider the language you are using around ESG, especially in public-facing media. ♦



By Sydney Moore

STANDARDIZING SUSTAINABILITY EFFORTS

Increasing the sustainability of their operations as well as their end products is a top concern for many companies operating in the lubricants industry right now. This is a necessary and noble endeavor—albeit a lofty one—that might leave many companies wondering where to even start.

Fortunately, the American Petroleum Institute has taken some of the guesswork out of the task. The standard-setting organization recognized the need for an industry-specific and consensus-based methodology for calculating the

carbon footprints of lubricants and specialty products and thus developed API Technical Report (TR) 1533, Lubricants Life Cycle Assessment and Carbon Footprinting – Methodology and Best Practice.

The technical report was published on May 4, 2023, and is available to all free of charge on API's website (www.api.org).

In a press release announcing the publication of the document, API said that the purpose of API TR 1533 "is to promote harmonization and consistency in the application of Life Cycle Assessment (LCA) and Carbon Footprints of Products (CFP) across the lubricants industry. This publication will help to enhance customer confidence with product benefit claims related to sustainability."

According to API, LCAs and CFPs are "established methodologies used to quantify the environmental performance of products, processes or services, and are increasingly being used as a basis for environmental decision-making along the supply chain."

While LCA involves multiple "impact categories," CFP focuses on the specific impact category of climate change, which envelops both emissions and removal of greenhouse gases.

To get a better understanding of how API TR 1533 was created as well as its implications for the lubricants industry as a whole, *Lubes'n'Greases* spoke with Jeffrey Harmening, API senior program manager, Engine Oil Licensing & Certification System (EOLCS).

Lubes'n'Greases: Why and how was API TR 1533 developed? Who contributed to its development?

Harmening: Ultimately, API member companies came forward to API because this was an issue that was unstandardized. At the outset, our member companies were dealing with these types of questions that they get from their customers. One of the concerns from the industry at large is if we don't have a standard or a guideline that someone can follow, then it will become the Wild West and there will be no real ability to compare Company A's reported sustainability claims to Company B's sustainability claims.

API established a work group in June of 2021 with the charge of gathering subject matter experts from all contributors to the lubricant value

chain, and the assembled "SME task force" began their efforts later that fall. The group includes expertise not only from the marketers but also the base oil and additive technology companies who shared in this effort. Thanks to the hard work and dedication of the SMEs involved and a rigorous meeting cadence, the group was able to prepare a draft for ballot in about 13 months.

Lubes'n'Greases: Do you anticipate that companies of different sizes will utilize API TR 1533 in different ways?

Harmening: I would suspect that the large, integrated companies that have the resources at hand and have likely been dealing with this for a long time may have many of these practices already in place. Remember, these are the folks that wrote the document.

Whereas, as you get to the smaller companies, they have far fewer resources to dedicate to this. I would suspect that smaller companies don't have a dedicated sustainability person, so they're looking for all the help they can get as they answer the same questions from their customers that the larger lube companies do.

So I do think while the practices within TR 1533 are wholly voluntary, a larger company is probably more familiar with what's in the document already versus a smaller independent lube marketer. In that sense, this is written for all of them.

Lubes'n'Greases: It has been said that API TR 1533 will help to enhance product benefit claims. How will it do this? Are there instances in which this is already happening?

Harmening: The intent behind the API Technical Report 1533 publication is to share the depth and breadth of knowledge among API member resources and to outline common practices and definitions around lubricant-specific carbon footprinting and life cycle analysis. There are many lube marketers out there, whether independent or otherwise, who are being asked by existing and potential customers alike to provide product carbon footprints, but who are not necessarily equipped to jump right in. API TR 1533 seeks to aid these folks with "getting started on their sustainability journey" and help them consider the impacts of their lube production and distribution processes. Once their processes are assessed and understood, companies may by extension continue to improve their carbon-related output from stage to stage to realize their own sustainability potential.

As I have learned through supporting the subject matter experts throughout the TR 1533 development process, there are certainly instances in which this is already happening. It is the culmination of much effort already expended among the API

member companies in their own day-to-day operations, and that has served as the foundation for this consensus-based document.

Lubes'n'Greases: What are the stages of the lubricant life cycle as defined by API TR 1533? Can you explain what each stage entails?

Harmening: The API technical report begins by defining the six stages of the lubricant life cycle: raw materials, production, packaging, logistics, loss-in-use and end-of-life. The first three stages (raw materials through packaging) may also be referred to as the Cradle-to-Production Gate, while the first four stages (raw materials through logistics) are more commonly referred to as the Cradle-to-Customer Gate. Collectively, the scope of a Product Carbon Footprint will be defined by the practitioner at one of these two gates, depending on individual assessment goals.

Raw materials make up an important contribution to the LCA and CFP of the product and have been subdivided into two main groups: base oils and rerefined base oils (API Groups I-V), and additives. Depending on the list of ingredients of a finished lube, this section outlines the types of data needed for each constituent. An accurate accounting in this stage will require collaboration with the suppliers of the individual components.

The production stage outlines the data collection requirements for all production processes and considers the emissions output due to consumption of thermal energy and imported electricity and steam, fuel consumption in on-site operations, waste lubricants and more. The packaging stage considers energy consumption data regarding the raw material type and nature, the manufacturing process for the packaging and labels, and the transport of these materials to the blend plant, among

other considerations. At the logistics stage, the emissions associated with getting the product to the customer are considered. Although important to consider as an area for improvement, the contribution from logistics to the overall CFP tends to be smaller, with exceptions for special circumstances of intercontinental import or air freight transport.

But the document also considers the In-Use phase and the End-of-Life phases, which, when taken with the previous four stages, represent the full Life Cycle Analysis of the product. In-use emissions refer to the emissions of, including but not limited to, losses due to combustion, volatility or leakage, and this stage begins when the end user takes possession of the lubricant. It is this stage of the lubricant life cycle in which the benefits of avoided emissions through fuel economy or extended drain intervals may be considered when determining the full LCA of a product.



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Finally, the end-of-life stage looks at all the emissions related to the waste fates of a lubricant that has reached the end of its useful life. The most common waste fates are used oil recycling, combustion (with or without heat recovery) and landfill disposal. This stage also considers the waste fate of the packaging in a similar vein.

Lubes'n'Greases: The press release announcing the publication of TR 1533 stated that the "document will also help to move toward harmonized practices and to reduce individual requirements across global markets." How has API crafted TR 1533 to take into account the global nature of the lubricants industry?

Harmening: It's an overall objective for us to ensure that what we put down in our document syncs up with other sustainability publications from around the globe, so we don't have duplicative or incongruent require-

ments from, say, the North American marketplace to the European marketplace to the Asian marketplace. We want to give our oil companies the best chance to satisfy all the local regulations or practices with minimal overlap and undue need to extend resources.

We're happy to have international liaison groups on this topic. We've got a really good working relationship with folks around the world who are dealing with this topic and putting things down on paper.

Lubes'n'Greases: It seems as if API TR 1533 is a living document. How might it evolve in the future to even better serve the lubricants industry?

Harmening: This is a voluntary publication, and it is up to the individual companies if or how they wish to incorporate this into their company practices, but we think there's a lot of value in the publication, and we're

hopeful it will gain wide industry acceptance.

That said, this will be a living document. Many compelling suggestions for improvement, added clarity and additional harmonization with other global methodologies were received during the ballot and public review processes, and these will be considered for the next iteration of TR 1533. The methodologies and practices regarding lubricant sustainability are in a near-constant state of scientific improvement as the lubricants industry continues to address the needs of its customers. The SMEs will continue to convene to advance the concepts that this technical report describes with the goal of full recommended practice in mind. ♦



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Product News

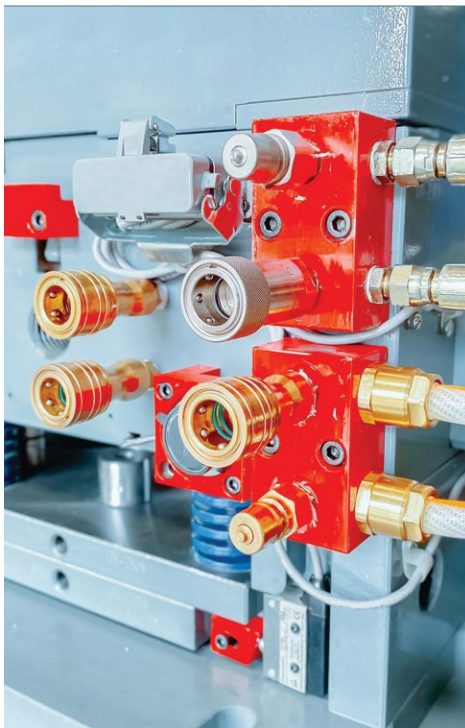
PCMO Power

Duckhams Oils QXR range of passenger car motor oils are designed to boost performance and protection of modern vehicles. All oils in the range are fully synthetic and provide improved fuel economy, excellent thermal stability and increased engine cleanliness. The oils also offer reduced deposits and sludge formation, increased antiwear and corrosion protection and reduced emissions. Made up of eight different formulations, the range meets the latest industry standards, Duckhams says. The respective engine oils are available in varying viscosity grades, including SAE 0W-16, 0W-20, 0W-30, 10W-50 and 5W-30. www.duckhams.com



Renewed and Refreshed

Neste rolled out its new Neste ReNew lubricant product family in Finland, Sweden, the Baltic countries and Poland. The new lubricants are produced with renewable or rerefined base oils as well as high-quality additives, the company says, and can contribute to a reduced carbon footprint. The Neste ReNew lubricants are a drop-in solution and include motor oils for gasoline- and diesel-powered cars, vans and hybrid vehicles. The products in the range also include universal tractor oil and hydraulic oils for agriculture and other industrial machinery. www.neste.com



Cooling and Corrosion Protection

Cortec's VpCI-649 BD can be added to cooling water tanks while the system is operating to provide long-term protection for ferrous and non-ferrous metals in water and glycol closed-loop systems. It combines contact corrosion inhibitors with vapor phase corrosion inhibitors. As the water circulates, VpCI-649 BD forms a corrosion inhibiting film on the metal and continues to protect these surfaces even after the water is drained for offline tooling storage. VpCI-649 BD also fights scale with the presence of an acrylic polymer. It does not contain nitrite, phosphate or chromate and is available in a molybdate-free version. www.cortecvci.com

Cartridge Pump

AECP is a compact cartridge pump from SKF that provides effective lubrication to such equipment as small agricultural and construction machinery. The robust, compact cartridge pump simplifies and improves lubrication by dispensing grease from standard tubes that are widely available from distribution or retail outlets. The pump automatically lubricates up to 22 lubrication points, making it more time- and cost-effective than manual methods. Other benefits include increased equipment availability and reliability, simpler maintenance as well as easier retrofitting. It also fits into tight spaces and can withstand extreme environments. www.skf.com ♦

Places'n'Faces



An automatic filling line that is part of the plant expansion for sustainable sulfur carriers at Lanxess' site in Mannheim, Germany.

Lanxess Completes Sulfur Carrier Expansion

Lanxess completed an expansion at its Mannheim, Germany, factory of production capacity for sustainable light-color sulfur carriers—used as extreme pressure additives for lubricants mainly used in the metal-working industry.

The project will boost potential output of the materials by several thousand metric tons per year.

The company did not disclose the specific capacity increase and said in a Dec. 13 news release that the project represented an investment amount in the double-digit millions of euros. The expansion was originally announced in August 2021.

Looser Euro 7 Headed for Approval

The European Council and European Parliament reached a provisional agreement in mid-December to not make major changes to passenger car engine emissions limits in the upcoming Euro 7 standard.

That resolution may avoid creating new emissions-related performance requirements for crankcase oils lubricating light-duty internal combustion engines.

The handshake between part of the European Union's executive (the Council) and member state representatives (the Parliament) would further tighten emissions caps for heavy-duty trucks and buses.

The auto industry hailed the agreement as a practical solution that avoids weighing down an industry that is striving to convert to electric vehicles—without much environmental benefit. Watchdog groups complained that the governing bodies missed an opportunity to improve protections for human health.

The Council and Parliament still need to formally approve the legislation. The parts affecting cars and vans would take effect 30 months later, while those involving trucks and buses would take four years to implement.

Fuchs Expands in South Africa

Fuchs Lubricants announced it is investing 218 million rand (U.S. \$11.4 million) in the second phase of an expansion that will increase production capacity at its Isando, South Africa, factory by 40%.

Started last year, the phase two expansion is expected to be completed this year.

Fuchs, which is headquartered in Mannheim, Germany, declined to disclose the capacity.

"As part of our growth strategy, we started planning our capacity expansion some five years ago," Managing Director Paul Deppe said in a news release. The first phase of the project involved acquiring additional land at the Isando facility and constructing a combination warehouse and office complex, which was completed in mid-2022.

"The next part of our expansion is to increase our production capacity," Deppe said, noting the current plant is operated around the clock seven



An upgrade of the Sanoat base oil plant in Fergana, Uzbekistan, is scheduled to be completed in 2025.

days a week. “To meet market demand, we had to look at expanding our production capability,” he said. “It also afforded us the opportunity to introduce the latest technology in blending and filling processes.”

The new warehouse in Isando incorporates technology such as scanning and system driven batch control. The new materials-handling equipment includes narrow-aisle turret trucks stacking up to 17 meters high. The warehouse includes a comprehensive environmental, safety and fire system, including in-rack sprinklers and automated spill barriers.

Uzbekistan Base Oil Upgrade Delayed

A project to upgrade Uzbekistan’s only base oil plant has been delayed and is now scheduled to be completed in 2025, instead of 2024, according to an official with SEG Motol, the newly established lube arm of oil major Saneg.

The plant, located in the eastern city of Fergana, will have capacity to produce 150,000 tons per year of API Group II and III base oils, SEG Motol

spokesperson Roman Zimovets said.

The lubricant arm of Saneg, formally named Sanoat Energetika Guruhi, is undertaking a broader modernization of the overall refinery at Fergana. The project includes construction of a hydrocracking unit that will enable the base oil plant to make higher grade fluids.

Zimovets said the company is also making improvements to the existing Group I base oil plant, which has nameplate production capacity of 500,000 t/y. The facility dates back to the Soviet Union era, when Uzbekistan was one of the empire’s republics.

Brenntag Restructures Business

Germany-based chemicals and ingredients distributor Brenntag will place its finished lubricants business under its new Brenntag Essentials division as part of a portfolio shift, the company said Dec. 5.

The portfolio shift includes moving the company’s finished lubricants, water treatment and semi-specialties businesses from Brenntag Specialties to the Brenntag Essentials

CONFERENCE CALENDAR

FEBRUARY

6th - 8th 28th ICIS World Base Oils and Lubricants Conference

London, UK
events.registration@icis.com
<https://events.icis.com/website/9160/home/>

19th - 21st Argus Global Base Oils Conference

London, UK
conferences@argusmedia.com
<https://www.argusmedia.com/en/conferences-events-listing/global-base-oils-conference>

MAY

19th - 23rd STLE Annual Meeting & Exhibition

Minneapolis, MN
<https://www.stle.org/annualmeeting>

JUNE

19th - 23rd STLE Annual Meeting & Exhibition

10th - 13th NLGI 91st Annual Meeting
 San Antonio, TX
nlgi@nlgi.org
<https://www.nlgi.org/annual-meeting/>



A view of Lwart's rerefinery in Lencois Paulista, Brazil, which has 78,000 metric tons of API Group II base oil production capacity. The company announced plans to construct a new rerefinery plant at the site.

division. All pharmaceutical activities will be transferred from Brenntag Essentials to Brenntag Specialties.

"These shifts will sharpen the divisional profiles aligned with specific customer and supplier needs and increase the coherence within the division regarding the business model and the product portfolio," the company said in a press release.

In an investor presentation, the company said transferring the finished lubricants business to Brenntag Essentials will enable it to leverage Brenntag Essentials' efficient last-mile delivery.

The company explained in its presentation that last-mile service operations feature a sales and service center in a local market to perform bulk breaking, packaging and last-mile delivery services. It also offers a comprehensive catalog of standard products and local services, along with value-added services, such as blending and mixing operations.

Lwart Will Expand Brazilian Rerefinery

Lwart Environmental Solutions said that it will expand its used lubricant rerefinery in Lencois, Brazil, by 50%,

making it one of the largest such facilities in the world.

The project will cost 1 billion reais (U.S. \$200 million) and will raise the plant's waste oil processing capacity to 324,000 metric tons per year and is scheduled to come onstream in 2025.

Neither the Oct. 23 news release about the project nor the company's website specify the plant's base oil production capacity before or after the project. According to Lubes'n'Greases' Base Stock Plant Data, the plant currently has capacity to make 1,550 barrels per day of API Group II base oils.

Lwart President Thiago Trecenti said the project is significant for Brazil as the country depends on imports for a large portion of its base oil needs, and Lwart is the only domestic source of Group II oils.

Aramco Buys Pakistan Channel for Valvoline

Saudi Aramco signed definitive agreements to acquire a 40% equity stake in Gas & Oil Pakistan Ltd.—a diversified downstream fuels, lubricants and convenience stores operator—in part to expand the market for its Valvoline subsidiary's lubricants.

The cost was not disclosed for the transaction, which is subject to conditions, including regulatory approvals.

"This transaction would enable Aramco to secure additional outlets for its refined products and further provide new market opportunities for Valvoline-branded lubricants, following Aramco's acquisition of the Valvoline Inc. global products business in February 2023," Aramco stated in a Dec. 12 press release.

In March, Valvoline completed the sale of its Global Products business, which includes engine oil sales, to Saudi Aramco. That deal was first announced in August 2022.

The planned acquisition of Gas & Oil Pakistan is Aramco's first entry into the Pakistani fuels retail market, advancing the company's strategy to strengthen its downstream value chain internationally.

Graphene Manufacturer Opens Australia Plant

Graphene Manufacturing Group Ltd. commissioned a natural gas-to-graphene production plant in Richlands, Australia, that is intended to make different types of graphene for the company's end products, including lubricants.

Fluid lubricants typically use graphene as an additive to help reduce friction and wear in automotive and industrial applications. The company said that because of the plant's modular design, it expects to be able to install at least an additional 20 graphene production units in the Richlands manufacturing facility with most of the supporting infrastructure for these additional production units already installed as part of this initial project. Production capacity was not disclosed.

The plant's gas-to-graphene technology is based on the company's plas-

ma technology, which splits natural gas into graphene and hydrogen gas.

The expected final cost of the facility is AUS \$2.9 million (U.S. \$2 million), including infrastructure for other future modular production units. The company said such production units will be installed as required for its sales.

Rerefinery Opens Near Arctic Circle

A base oil rerefinery that opened recently in Severodvinsk, Russia, may not be large, but it appears to be the northernmost such facility in the world.

Severodvinsk is located in northwestern Russia, on the White Sea, 227 kilometers south of the Arctic Circle. It is at the same latitude as Iceland and the United States state of Alaska.

The rerefinery is operated by a local company, Oils Northwest Affiliate, which says the facility was built for U.S. \$1.8 million. It has capacity to process 12,000 metric tons of waste oils per year and to make 8,400 t/y of API Group I base oil.

The company is licensed to collect used oils in the Arkhangelsk oblast and the neighboring Vologoda oblast. It has signed agreements for used oil collection with large companies in the region.

Richful Receives Warning from Securities Bureau

Richful Lube Additive Co. disclosed that it received a warning from securities officials who concluded that some funds raised from a 2020 public stock offering were not used as the company had said on a factory that is under construction.

According to a Dec. 25 Richful filing on the Shenzhen Stock Exchange, the letter from the Henan

Supervision Bureau of the Chinese Securities Regulatory Commission did not specify the amount of funds in question. Richful's filing said the bureau filed a record of its finding, but it did not mention any penalty.

Richful, which operates in China as Ruifeng New Materials Co., said it will make adjustments to its oversight and administration of such projects to prevent a recurrence of such incidents.

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Briefly Noted

China's government prohibited the use of short-chain chlorinated paraffins beginning on Jan. 1, aligning with numerous other countries that have outlawed the chemicals out of health concerns.

Independent toll blender **UMW Lubetech Sdn.** has increased its production capacity by more than two-thirds to 60 million liters (54,000 metric tons) per year. UMW Lubetech is a member company of the Malaysian conglomerate UMW Holdings Bhd.

In a move to diversify, **NewMarket Corp.**, the parent company of lubricant additive supplier Afton Chemical, agreed to buy **American Pacific Corp.**, a producer of oxidizing chemicals used for space and defense applications. NewMarket said it will pay \$700 million to acquire American Pacific's parent, Ampac Intermediate Holdings LLC. The deal is subject to review by competition authorities, but NewMarket predicted it will close in the first quarter this year.

S-Oil completed construction of a technical service and development center in South Korea on 36,700 square meters at Magok Industrial Complex in Gangseo-gu, Seoul. The company said the center will conduct research and development on lubricants for conventional internal combustion engines and will also spearhead technical development for lubricants for electric and hydrogen vehicles as well as for fluids that cool electric vehicle batteries.

Azelis opened a laboratory dedicated to lubricants and metalworking fluids in the north of Milan, Italy. The specialty chemicals and food ingredients service provider said it transferred the facility to benefit

from more space and potential to further scale its capabilities in 2024 and better serve the Europe, Middle East and Africa region. The company also signed an agreement to acquire **Localpack S.A.**, a specialty chemical distributor active in Colombia. Among other products, Localpack distributes polyalphaolefin and synthetic esters, viscosity index improvers and additive packages and components for greases and lubricants.

Orem, Utah-based **Bridgesource** expanded its portfolio with the acquisition of **First Source Fuels**, a Utah-based provider of fuel, oil and lubricants.

Russian lubricant maker **VMPAvto**, opened a small factory in Saint Petersburg's Kirovsky district, which has port access to the Gulf of Finland. According to the company, the plant has capacity to make 12,000 metric tons of lubes per year and is has a filling line capable of filling 1,000 plastic four-liter canisters per hour.

Vibra Energia, one of Brazil's largest lubricant suppliers, rejected a merger offer from **Eneva**, calling the proposal insufficient. But Vibra said it would consider better offers, and the company reportedly has since retained an advisor for evaluating such solicitations.

Faces in the News

Nick Clague joined United Kingdom-based lubricants manufacturer SAR Lubricants in January as technical director.

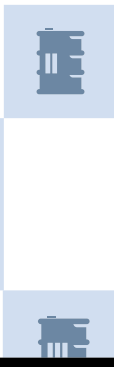
Bangladesh's Eastern Lubricants Blenders Ltd. appointed Engineer **Mohammad Shahidul Alam** managing director effective December 7. ♦

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Posting Date	Viscosity 70			Viscosity 100			Viscosity 148-165		
	Signal	Price	Eff. Date	Signal	Price	Eff. Date	Signal	Price	Eff. Date
January 6, 2021	3.43	1.087	12/10/20	3.44	1.085	12/10/20	3.89	1.133	12/10/20
January 13, 2021	3.43	1.087	12/10/20	3.44	1.085	12/10/20	3.89	1.133	12/10/20
January 20, 2021	3.83	1.181	01/20/21	3.84	1.177	01/20/21	4.08	1.208	01/20/21
January 27, 2021	3.83	1.181	01/20/21	3.84	1.177	01/20/21	4.09	1.206	01/20/21
February 3, 2021	3.83	1.181	01/20/21	3.84	1.177	01/20/21	4.09	1.206	01/20/21
February 10, 2021	4.13	1.284	02/19/21	4.14	1.289	02/19/21	4.39	1.348	02/19/21
February 17, 2021	4.13	1.284	02/19/21	4.14	1.289	02/19/21	4.39	1.348	02/19/21
February 24, 2021	4.13	1.284	02/19/21	4.14	1.289	02/19/21	4.39	1.348	02/19/21
March 3, 2021	4.13	1.284	02/19/21	4.14	1.289	02/19/21	4.39	1.348	02/19/21
March 10, 2021	4.13	1.284	02/19/21	4.14	1.289	02/19/21	4.39	1.348	02/19/21
March 17, 2021	4.13	1.284	02/19/21	4.14	1.289	02/19/21	4.39	1.348	02/19/21
March 24, 2021	4.33	1.347	03/24/21	4.34	1.331	03/19/21	4.59	1.409	03/24/21
March 31, 2021	4.33	1.347	03/24/21	4.34	1.331	03/19/21	4.59	1.409	03/24/21
April 7, 2021	4.33	1.347	03/24/21	4.34	1.331	03/19/21	4.59	1.409	03/24/21
April 14, 2021	4.33	1.347	03/24/21	4.34	1.331	03/19/21	4.59	1.409	03/24/21
April 21, 2021	4.33	1.347	03/24/21	4.34	1.331	03/19/21	4.59	1.409	03/24/21
April 28, 2021	4.48	1.393	05/03/21	4.49	1.377	04/30/21	4.74	1.455	05/03/21
May 5, 2021	4.48	1.393	05/03/21	4.49	1.377	04/30/21	4.74	1.455	05/03/21
May 12, 2021	4.48	1.393	05/03/21	4.49	1.377	04/30/21	4.74	1.455	05/03/21
May 19, 2021	4.48	1.393	05/03/21	4.49	1.377	04/30/21	4.74	1.455	05/03/21
May 26, 2021	4.48	1.393	05/03/21	4.49	1.377	04/30/21	4.74	1.455	05/03/21
June 2, 2021	4.48	1.393	05/03/21	4.49	1.377	04/30/21	4.74	1.455	05/03/21
June 9, 2021	4.48	1.393	05/03/21	4.49	1.377	04/30/21	4.74	1.455	05/03/21
June 16, 2021	4.63	1.440	06/23/21	4.64	1.423	06/18/21	4.89	1.501	06/23/21
June 23, 2021	4.63	1.440	06/23/21	4.64	1.423	06/18/21	4.89	1.501	06/23/21
July 7, 2021	4.63	1.440	06/23/21	4.64	1.423	06/18/21	4.89	1.501	06/23/21
July 14, 2021	4.63	1.440	06/23/21	4.64	1.423	06/18/21	4.89	1.501	06/23/21
July 21, 2021	4.63	1.440	06/23/21	4.64	1.423	06/18/21	4.89	1.501	06/23/21
July 28, 2021	4.63	1.440	06/23/21	4.64	1.423	06/18/21	4.89	1.501	06/23/21
August 4, 2021	4.63	1.440	06/23/21	4.64	1.423	06/18/21	4.89	1.501	06/23/21
August 11, 2021	4.63	1.440	06/23/21	4.64	1.423	06/18/21	4.89	1.501	06/23/21
August 18, 2021	4.63	1.440	06/23/21	4.64	1.423	06/18/21	4.89	1.501	06/23/21
August 25, 2021	4.63	1.440	06/23/21	4.64	1.423	06/18/21	4.89	1.501	06/23/21
September 1, 2021	4.63	1.440	06/23/21	4.64	1.423	06/18/21	4.89	1.501	06/23/21
September 8, 2021	4.63	1.440	06/23/21	4.64	1.423	06/18/21	4.89	1.501	06/23/21
September 15, 2021	4.63	1.440	06/23/21	4.64	1.423	06/18/21	4.89	1.501	06/23/21
September 22, 2021	4.63	1.440	06/23/21	4.64	1.423	06/18/21	4.89	1.501	06/23/21
September 29, 2021	4.63	1.440	06/23/21	4.64	1.423	06/18/21	4.89	1.501	06/23/21
October 6, 2021	4.63	1.440	06/23/21	4.64	1.423	06/18/21	4.89	1.501	06/23/21
October 13, 2021	4.63	1.440	06/23/21	4.64	1.423	06/18/21	4.89	1.501	06/23/21

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