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A SUNNY OUTLOOK

Industry players see nothing but blue skies for biobased lubricants

CYBER-SECURE

Safeguarding your company's valuable data... **page 20**

BACK TOGETHER, EMBRACING CHANGE

ILMA members gather in person for the first time since 2019... **page 24**





A Sunny Outlook

Industry players see nothing but blue skies for biobased lubricants

When the effects of pandemic lockdowns inspired businesses and governments to recharge their sustainability efforts, biolubricants stepped up as part of the solution.

“Biolubricant markets have been government-driven or regulatory-driven for a while,” said Sharbel Luzuriaga, project manager in the Kline Group’s energy/petroleum practice. “We are getting closer to that tipping point where demand for biolubricants will be market-driven.”

It’s becoming a world where biolubricants are valued not just for their biodegradability but for their contributions to a life cycle view of sustainability. Challenges remain, but

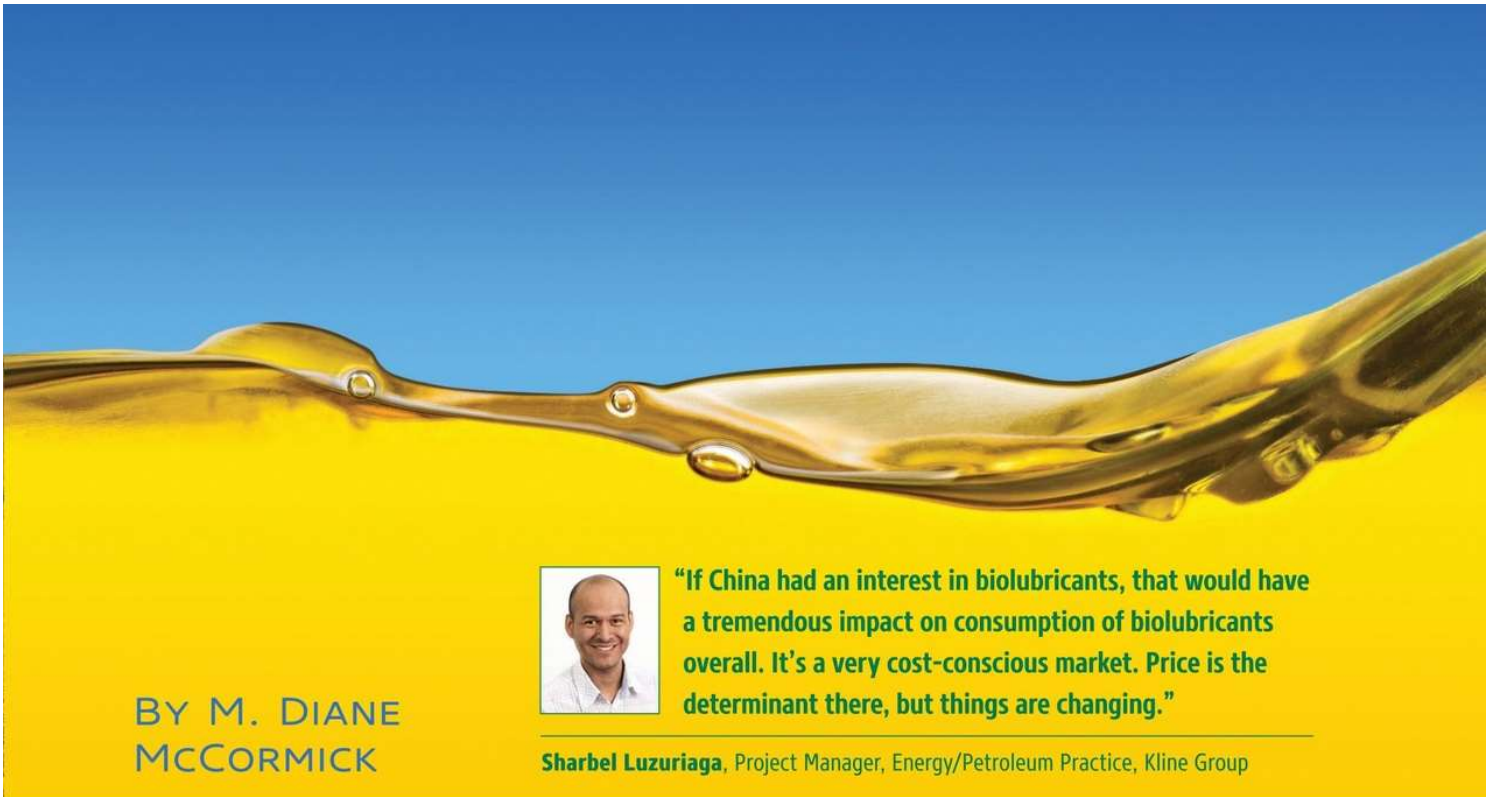
the outlook for biolubricants is sunny. “Sustainability and environmental protection are ideas whose time has come,” said Mark Miller, CEO of Biosynthetic Technologies.

A Life Cycle Perspective

In their infancy, biolubricants were designed to avert damage to sensitive forests and waterways. That narrow concept is now yielding to a “holistic view of preserving resources,” said Luzuriaga. “It’s about providing a circular economy and raw materials that will be reused. That point is also connected to reduction of the waste stream, and reduction of the waste stream that might be toxic, while keeping high performance levels.”

In the 2010s, business and government sustainability goals were gaining momentum. The pandemic turned that wave into a tsunami. “Governments are taking stronger determination to target environmental sustainability, especially in Europe, and now in the U.S. with the new administration,” Luzuriaga said. “The U.S. was lagging behind Europe over the last four or five years, but expectations now are on what the U.S. will be doing in this area.”

While details emerging in U.S. climate change policies are scant on the role of base oils, Miller believes that the political climate creates opportunity because “the world is moving toward green. It’s moving toward more sustainability.”



BY M. DIANE
MCCORMICK



“If China had an interest in biolubricants, that would have a tremendous impact on consumption of biolubricants overall. It’s a very cost-conscious market. Price is the determinant there, but things are changing.”

Sharbel Luzuriaga, Project Manager, Energy/Petroleum Practice, Kline Group

In this worldview, biolubricants are valued not only for their gentle touch on earth and water but also for their reduction of energy consumption and emissions. Putting measurements on those environmental benefits gets the attention of corporations that are pinning profitability and growth to their environmental, social and governance, or ESG, goals, said Jeff Hart, founder and chairman of BioBlend.

BioBlend, maker of plant-based environmentally acceptable lubricants (EALs) and greases, is exploring the keys to helping customers better focus on biobased and renewable lubricants and their benefits. “We’re working for a good understanding of what it would take for these products to give customers what they need in performance and sustainability,” Hart said.

In addition to voluntary schemes like the European Union’s Ecolabel, industry efforts to establish standards for measuring sustainability include certification processes for raw materials, such as the Roundtable on Sustainable Palm Oil Manufacturers’ Principles and Criteria Certification, said Luzuriaga. Such policies address raw-material procurement but are also “adopting ways to reduce carbon foot-

print during manufacturing, maybe by using renewable energy or packaging that uses recycled plastic.”

The sustainability life cycle closes with scrutiny of end use — whether the product can reduce energy consumption or emissions. Sustainability offers a new way of defining quality in lubricant products, said Luzuriaga. “Recently, the market has witnessed multiple claims of low-carbon/zero-carbon lubricants where the footprint is assessed on a different basis or perspectives, such as renewable content, high performance or reduced energy consumption, and biodegradability and zero toxicity,” he said.

Hart said his products have been there when government regulations called for lubricants that are safe for environmentally sensitive areas, such as hydropower plants in rivers rich with aquatic life. Now, governmental climate goals offer additional opportunity, he said.

In California, renewable and biolubricants could soon get the same recognition currently bestowed on re-refined oils as solutions toward the state’s goal of carbon neutrality by 2045, Hart said. “It just takes time for people to understand that

these products are as environmentally friendly or more than the re-refined oils that they’re using for some of those mandates.”

Biosynthetic Technologies manufactures the biobased synthetic compounds called estolides, with uses in lubricants for metalworking, automotive and other applications. Increasingly, the company hears from industrial companies whose boards want to accelerate their ESG goals.

Markets and Governments

With the increased emphasis on sustainability, biolubricants are carving out new markets. In North America, the current Vessel General Permit will be supplanted by the Vessel Incidental Discharge Act of 2018, and pending standards offer opportunities to present biolubricants as part of the solution in marine applications.

In Europe, the transition to renewable energy will “incur huge demands” for lubricants in hydroelectric plants and wind turbines, said Luzuriaga. Offshore wind farms, especially, will populate the environmentally sensitive North Sea, making the North Atlantic “a very important area where biolubricants can be in good demand.”

Providers of renewable energy “tend to think about sustainability,” noted Hart. In Arizona, the sustainability-minded owners of large wind farms are using BioBlend’s dust suppressants on their roads because “they’re not willing to spray harmful things on the ground.”

“Even though a wind farm is a very different business from biolubricants, we found ways to work together because environmentally friendly and renewable concepts are very important to both companies,” said Hart. “When corporate missions align, it certainly helps us to think about future ways to partner with companies.”

As electric vehicles increase their share of the automotive market, Luzuriaga sees some opportunity for biolubricants in thermal management of the batteries. Synthetic esters could be suitable fluids for immersion cooling, with high flashpoints to minimize fire hazards, and environmental friendliness in case of crash or leakage.

In China, South Korea and Japan, Luzuriaga sees rising acceptance of biolubricants. Steel manufacturing, transportation, construction, marine and electricity transmission are the sectors driving biolubricants in Asia. “If China had an interest in biolubricants, that would have a tremendous impact on consumption of biolubricants overall,” he said. “It’s a very cost-conscious market. Price is the determinant there, but things are changing.”

Miller also sees regulatory caution that slows progress in Asian markets. “Asia is sort of tinkering with it,” he said. “Getting regulatory approval in Asia is a challenge, especially if your product is not considered a polymer. There are a lot of hurdles to jump.”

The U.S. Environmental Protection Agency is also slow to approve new molecules, even if they’re bioderived and environmentally friendly, said Miller. “Getting things through regulatory compliance is going to get harder and more expensive,” he added.

Hart sees growth for biolubricants within “anything that touches the ground.” BioBlend developed its natural-ester road-dust suppressant to displace ubiquitous but harsh calcium chloride. Working with state soy boards, the company is rolling out the product to meet demand for environmentally friendly solutions to spray onto roadways.

The U.S. Food Safety Modernization Act has opened new possibilities for biobased products, agree industry players. BioBlend is making a strong push into food-grade biolubricants. “When we get soybean and canola oils from the producers, you could eat them,” said Hart. “Bigger users of food-grade lubricants have been very receptive.”

Biosynthetic Technologies has also been “exploring the intersection of food-grade and biobased oils,” said Miller. For producers that process their harvests or catches directly in the field or ocean, biolubricants check off all the necessary boxes — biodegradable, nontoxic and food-grade.

Meeting the Challenges

Cost and performance: There’s no secret about the challenges remaining in the biolubricants sphere, but industry players see progress on both fronts.

Biolubricants still command a premium compared to cheaper and abundant mineral oils. The handful of companies producing synthetic hydrocarbon base stocks — all based in North America — “need to have more scale in order to reduce the price,” Luzuriaga said. “In order to have that scale come up, you need to find the right route to markets. It’s kind of a chicken-egg question.”

Of course, production of plant-based synthetic lubricants isn’t simply a matter of “turning up the volume on the refinery,” noted Hart. Supply depends on the decisions that agricultural interests make on what to plant,

and high demand — such as today’s clamor for the feedstock for biodiesel fuels — can send prices rising.

Surging demand for soybeans and canola seeds, however, should inspire agricultural interests to plant “a lot more fields,” Hart said. “At the end of the day, you manage through the cycles, and at least today, it has all worked out. It’s definitely one of the nuances of biolubricants that you don’t have to deal with in the petroleum lubricants space.”

On the price front, biobased and renewable lubricant manufacturers can claim lower total cost of ownership, through such factors as lower handling costs and prevention of large fines for environmental spills. Miller also points to performance criteria — “extended oil change intervals, improved efficiencies, better operating costs overall.”

“People are getting much savvier, looking at the total cost of ownership as compared to the cost per gallon,” he said. “Biolubricants are more expensive than conventionally derived petroleum oil, but they bring value. They bring sustainability. They bring performance. They bring durability, but they also bring assurance that if you put a couple of drops into the Columbia River, you’re not shutting the river down, or if you’re an offshore drill rig, they don’t shut your drill down because you’ve got an oil slick in the Gulf of Mexico.”

Lower total cost of ownership is “one of our huge selling points,” agreed Hart. Years of data proving the performance capabilities of renewable biolubricants give confidence to end-use customers and lubricant marketers, building the trust that’s crucial to making inroads.

Biolube manufacturers have also made great strides in performance. In the past, these lubricants suffered in the presence of water and in extremely hot or cold temperatures. Today, these



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issues have been overcome through various processing methods, putting them on at least an equal footing with traditional lubricants in terms of performance.

In the post-recession 2010s, BioBlend found success with vegetable-based elevator oils — showing that they reduce electricity usage with better fire protection than their petroleum-based counterparts — and with greases based on canola and soybean oils. Using renewable, biodegradable synthetic esters, BioBlend also created high-performance, biodegradable synthetic lubricants that hold up in frigid climates.

“They’re still a lot more environmentally friendly, which feels good for some customers, but when you can actually outperform other petroleum-based products, that’s when things start to get interesting,” said Hart.

BioBlend is partnering with OEMs interested in testing renewable products for use in a variety of applications, Hart added. Achieving performance and change intervals that are equal or better to existing products is “table stakes. At the end of the day, people are still making good business decisions. If we can’t be at the same

price and performance at the same levels, customers typically don’t change.”

At Biosynthetic Technologies, testing reveals that its estolides show equivalent performance to top-tier polyalphaolefins (PAOs) and API Group III base stocks in oxidation and hydrolytic stability, said Miller. “If you look at that type of data, it shows that the material does what we say it can do.”

Looking Ahead

Biolubricants can’t claim the sustainability crown for themselves, Luzuriaga noted. Even non-biobased products can make claims of nontoxicity and biodegradability.

“The discussion is going beyond what is biobased into products that are high-performing and environmentally friendly,” he said.

But biolubricants are on the ascendency. Pre-pandemic, the global market growth rate for biolubricants exceeded the industry average — a static picture for lubricants overall. As we head out of the pandemic, the trend continues, with a predicted average 3.5% growth rate and highs as steep as 5%, said Luzuriaga.

Emerging economies in countries focusing solely on pandemic recovery

present “question marks” for biolubricants, he said, but the effects of COVID-19 in Europe and North America are reviving interest in sustainability. As huge capital expenditures and reactivation packages are floated, biolubricants can make a strong, sustainability-based case for a seat at the table — even among investors seeking fast returns to make up for lost time and money.

Hart sees customer demand piquing interest among private equity. “Big companies are making public statements that they want to do more,” he said. “They need to get focused on their carbon footprint, and it leads to more opportunity for companies like us that are focused in the renewable and biodegradable space.”

Miller looks around and sees “blue skies.”

“I see the entire market for sustainable materials growing,” he said. “I see the prognosis for our business and all the various sustainable alternatives really looking good. The world is ready for biolubricants, and we’re leading the way.”

McCormick is a Pennsylvania-based freelance journalist and a frequent Compoundings contributor.