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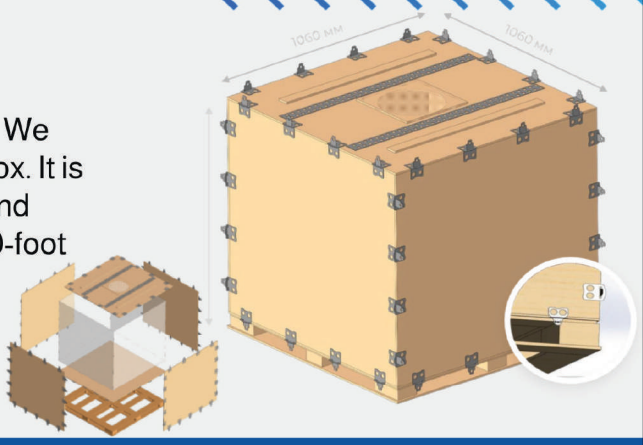

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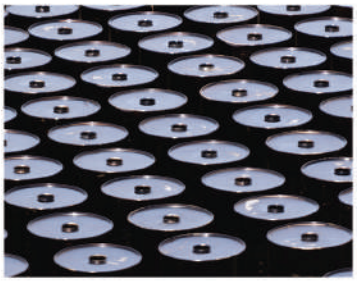

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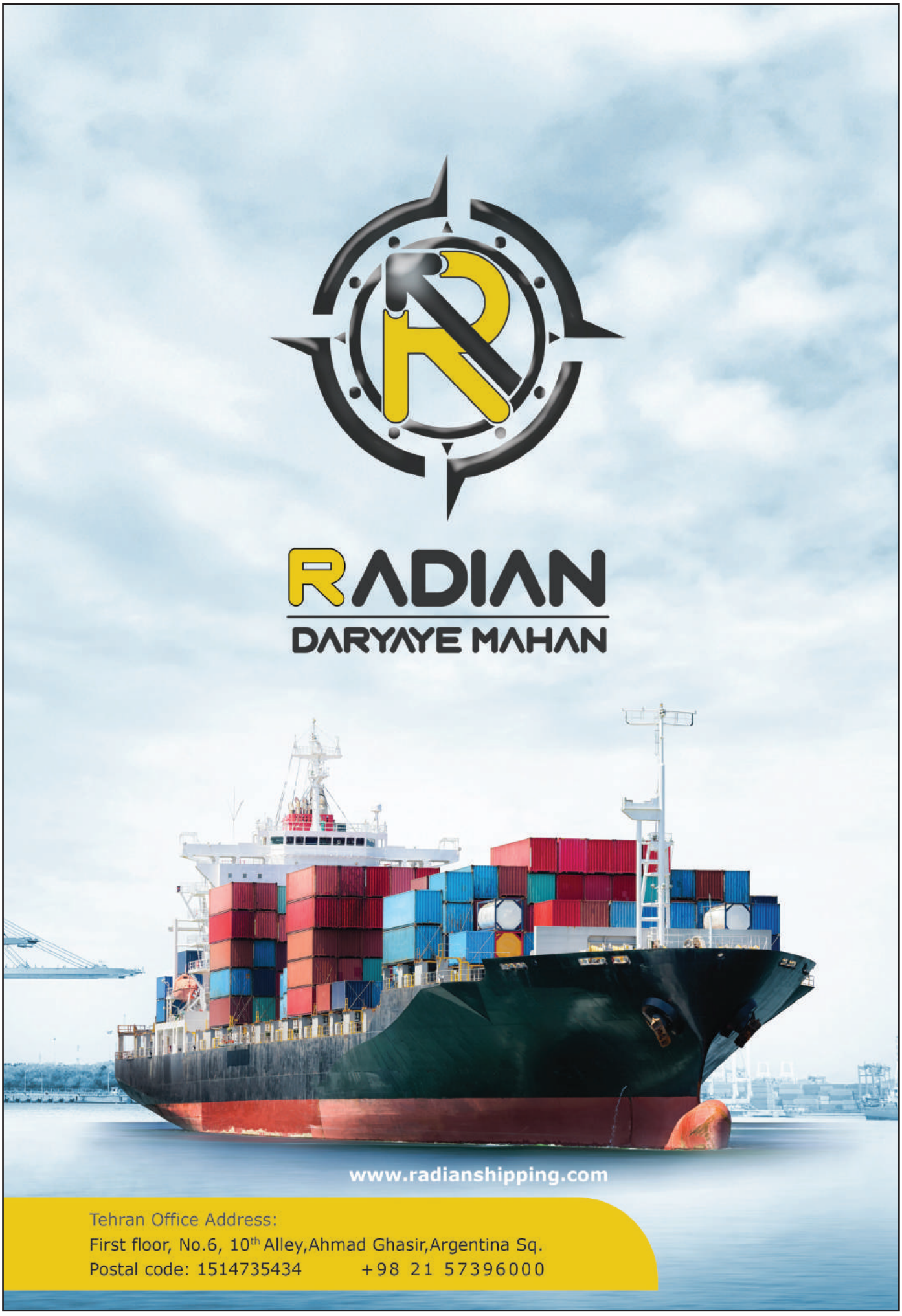
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EDITOR'S MESSGAE

With a decade of activity in the bitumen and petroleum derivatives industry in the field of printing and publishing specialized news and selected scientific articles from conferences, symposiums, research centers and universities, and introducing brands and companies producing petroleum and bitumen, the World of Petroleum and Bitumen Journal has been able to gain the trust of more than 6000 permanent audience in such a way that they would like to receive the print version of the journal every month.

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THE BITUMEN BEYOND COMBUSTION INITIATIVE

PART 2 – ASPHALT BINDER

In the initial installment of this series, Alberta Innovates pinpointed asphalt binder—the adhesive component in asphalt mixtures—as the most promising candidate among bitumen beyond combustion (BBC) products for achieving commercial success both in the short term and in the future.

According to Paolo Bomben, Alberta Innovates' director of Bitumen Beyond Combustion, this is due to several factors, even though asphalt binder commands a lower price compared to carbon fiber or energy carbon materials.

Three Key Advantages

1. Absence of Major Technological Hurdles

Bomben explained that increasing asphalt binder production does not face significant technical challenges. "Producing asphalt binder from bitumen and other heavy oils is a well-established and understood process," he noted. Commercial production already takes place in Alberta, notably at the Imperial Strathcona and Cenovus Lloydminster refineries.

While each producer employs proprietary methods to refine their product, the fundamental process involves distillation to achieve specific properties demanded by customers.

2. A Vast Global Market

The worldwide demand for asphalt—and, by extension, asphalt binder—far exceeds that of other BBC products. Global asphalt consumption is approximately 140 million tonnes annually, compared to 125,000 tonnes for carbon fiber and less than 3,000 tonnes for energy carbons. Bomben emphasized that demand for asphalt binder is poised to grow, fueled by population growth and the consequent need for infrastructure expansion, particularly roads.

3. Premium Product Quality

Asphalt binder derived from Alberta's bitumen is considered high quality. Bomben highlighted that as electric vehicles, which are heavier than traditional vehicles, become more widespread, the need for durable asphalt pavement will rise. Alberta's asphalt binder can meet these evolving requirements.

However, Bomben acknowledged a major obstacle: the

lack of cost-effective transportation options to ship asphalt binder over long distances at low temperatures. This limitation restricts its market access beyond Western Canada.

Enhancing Market Viability

To support its commercial potential, Alberta Innovates has initiated several studies. One study benchmarked the quality of Alberta's asphalt binder against global competitors, while another explored new potential markets for the product. Both were published in early 2021.

Additionally, Alberta Innovates has been funding and advising start-ups and research teams working on technologies to transform bitumen-derived asphalt binder into solid forms. Solidified binders could be economically transported in unheated rail cars and ships. Among these efforts, Calgary-based Solideum Inc. is leading the charge and is possibly closest to commercialization.

This article delves into the findings of the asphalt binder benchmarking and market studies, along with updates on Solideum's progress, as shared by Ian Gates, the company's COO and a professor of petroleum and chemical engineering at the

> *Solideum has developed a technology to process heavy oil, bitumen, and dilbit into lighter and heavier fractions.*

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University of Calgary.

Unmatched Quality of Alberta's Asphalt Binder

"Alberta's bitumen-derived asphalt binder is unparalleled in quality, comparable only to that of Venezuela," Bomben stated, citing results from the benchmarking study.

Conducted by Simon Hesp, a chemistry professor at Queen's University and an expert in asphalt binder research, the study analyzed binders produced from Alberta's main oilsands regions (Athabasca, Cold Lake, and Peace River). These were compared with asphalt binders derived from crude oil worldwide.

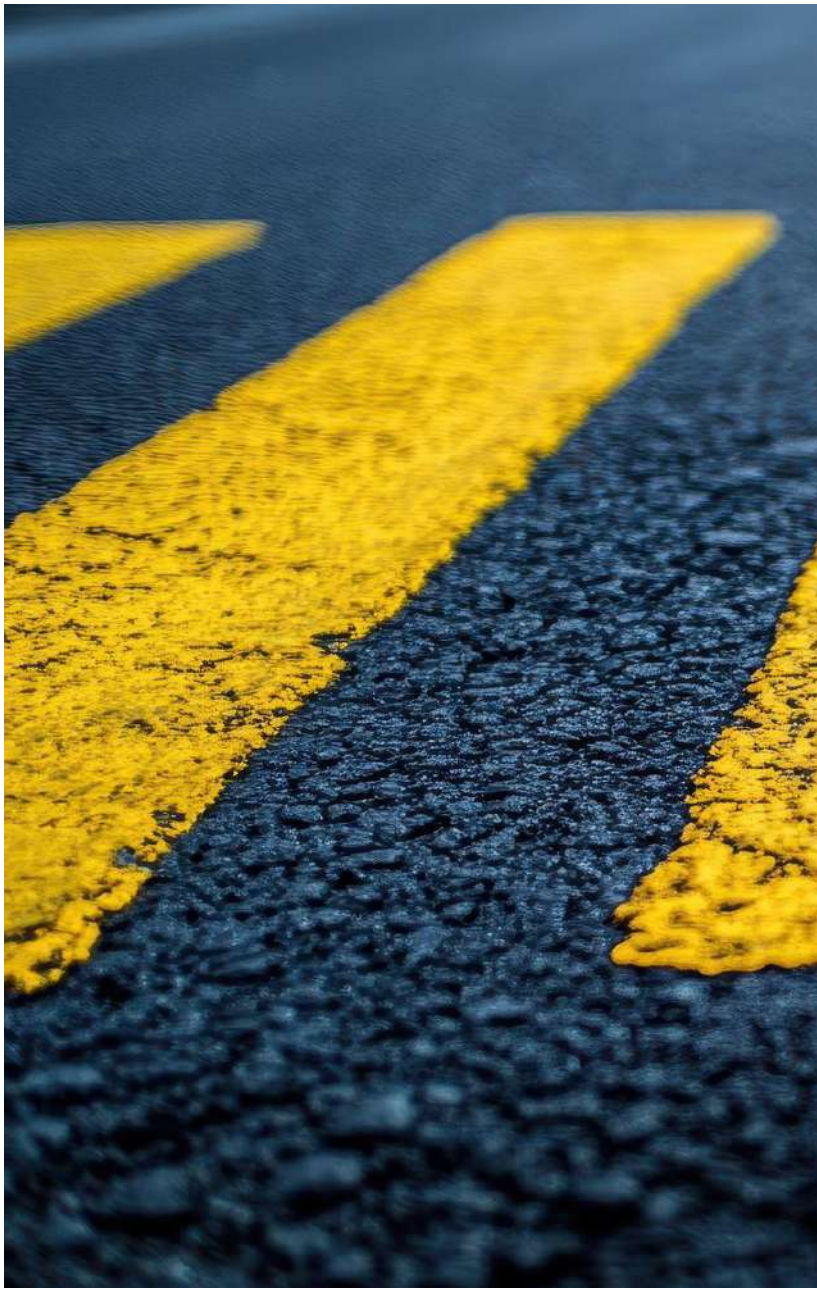
Hesp's findings highlighted Alberta binders' superior resistance to cracking, primarily due to their low wax content and moderate to high asphaltene levels, which ensure exceptional durability. Only Venezuelan binders exhibited similarly balanced properties.

Binders with high paraffin wax content become brittle in cold temperatures, leading to reduced adhesion and increased cracking.

Alberta's binders are considered "optimal" because of their uniform composition and minimal wax, reducing pavement cracking by up to 50%.

Hesp's research further revealed that roads using Alberta binders could last up to 40 years, compared to just 10 years in regions like New England, where lower-quality binders are common. Additionally, Alberta's low-wax binders are highly suitable for recycling, extending their lifespan by another 30 years.

However, Alberta's asphalt binder is relatively expensive, costing between $800 and $900 per tonne—approximately twice the price of lower-quality alternatives.



Exploring New Markets

To examine potential markets for asphalt binder, Alberta Innovates commissioned Houston-based ADI Analytics to study opportunities in Asia and the U.S., two regions well-positioned for solid binder products from Alberta.

As of 2020, Asia accounted for over 25% of global asphalt demand (39 million tonnes), while the U.S. represented nearly 20% (27 million tonnes). Both regions are projected to grow at rates exceeding 3% annually between 2020 and 2025, slightly below the global average of 3.6%.

In Asia, Canadian asphalt is most suitable for expressways, highways, and select airports. In the U.S., applications are concentrated in interstate highways, urban roads, and airports. According to ADI, Asian customers prioritize supplier relationships, pricing, and product quality, while U.S. buyers rank quality just after pricing.

Given the rising adoption of electric vehicles and increased recycling of asphalt pavement in both regions, high-quality binders are expected to gain importance. ADI concluded that Canadian producers must educate the market on the performance benefits of their products to carve out opportunities and stand out amid intensifying competition.

Solideum's Advancements

Solideum has developed a technology to process heavy oil, bitumen, and dilbit into lighter and heavier fractions. The heavier fraction can be converted into solid forms such as pellets, flakes, or spaghetti—the latter being the most cost-effective option—for transportation to distant markets.

The company has scaled its pilot project in Bonnyville from 100 barrels per day (b/d) to 500 b/d, with partial funding from Alberta Innovates. According to Gates, the technology has demonstrated excellent results, with no significant technical risks remaining.

"We've made considerable progress and now operate both a 2 b/d lab unit and the 500 b/d field unit to showcase our technology to potential clients," Gates said. However, he acknowledged that some clients are hesitant due to the lack of a fully commercialized unit with extended operating history.

Solideum anticipates commercialization at scales ranging from 1,000 b/d to 10,000 b/d. Gates emphasized that this technology could be instrumental in diversifying Alberta's heavy oil and bitumen production while reducing Scope 3 emissions.

Bomben suggested that such technologies, while promising, are still a few years away from being fully commercialized.

Lac La Biche, Canada: Project Aims to Boost Bitumen Flow and Reduce Water Usage BY WPB

Enhancing Bitumen Flow in Lac La Biche

Three cutting-edge initiatives have been awarded $2.7 million through Alberta's Technology Innovation and Emissions Reduction (TIER) program, focusing on advancing energy efficiency and minimizing environmental impact.

WPB:Enhancing Bitumen Flow in Lac La BicheThe Kirby North facility in Lac La Biche, operated by Canadian Natural Resources Limited, is set to test a chemical additive designed to improve the flow of heavy oil and bitumen in Steam-Assisted Gravity Drainage (SAGD) operations. Backed by $1.2 million in provincial funding, the project will use a chemical called ChampionX, which enhances oil flow, prevents blockages, and reduces steam requirements, thereby lowering water consumption.

Situated 85 kilometers northeast of Lac La Biche, the Kirby North plant utilizes SAGD technology to extract bitumen from deep oil sands deposits. Its counterpart, Kirby South, is located across Highway 881. According to The Oilsands Magazine, approximately 80% of Alberta's bitumen reserves lie too deep underground to be mined, necessitating in-situ extraction methods like SAGD, which rely on steam to recover the resource.

> "While testing for the Aqua Pure Technologies project is being conducted in the Three Hills area, the ERAs' testing site for the Eximius project has not yet been announced."

A provincial release issued in mid-December highlighted advancements in water recycling within Alberta's energy sector. Approximately 80% of water used in such operations is recycled, with sophisticated filtration systems treating wastewater to reduce freshwater use.

Broader Technological Innovation

This initiative near Lac La Biche is part of three projects funded through the TIER program. Alongside Canadian Natural's work, $1.47 million has been allocated to develop two advanced water filtration technologies led by Aqua Pure Technologies and Eximius Environmental Solutions.

The Emissions Reduction Alberta (ERA), a government-funded entity established in 2009, is managing the investment. Its mission is to address environmental challenges while supporting Alberta's economic growth through innovation. Aqua Pure's testing is already underway in the Three Hills area, while the site for Eximius Environmental Solutions' project has not been announced.

Promising Future for Alberta's Oil Industry

Justin Riemer, CEO of the ERA, emphasized the potential for these projects to provide actionable solutions for Alberta's oil and gas sector, helping reduce emissions, save water, and cut costs.

> "Three projects that are being funded by the province through a $2.7 million investment from the Technology Innovation and Emissions Reduction (TIER) program."

"These projects have already shown tremendous promise with backing from our partners. We're eager to see how provincial funding through Emissions Reduction Alberta can propel them forward," Riemer stated.

Rebecca Schulz, Alberta's Minister of Environment and Protected Areas, underscored the global significance of such innovations, noting the rising demand for energy and the global push for efficient resource use.

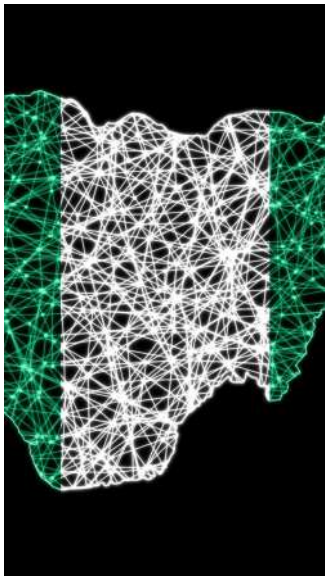
"This funding supports the development of three new technologies that will help companies reduce water usage while boosting energy production. It's a win for the environment, the energy sector, and the economy," Schulz said.

Nigeria:

Ondo Governor Pushes for Completion of 50 Road Projects

2025

WPB: Lucky Aiyedatiwa, the Governor of Ondo State in Nigeria, has directed the expedited completion of 50 township road projects currently underway in all 18 local government areas of the state. Reports indicate that the governor has authorized the release of funds to ensure the successful execution of these projects, which include asphalt overlays, road



reconstruction, and rehabilitation of selected routes across Ondo. This development was revealed by Ayoade Babalola, the Special Adviser to the Governor on Infrastructure, during a press briefing in Akure, the state's capital. Babalola highlighted that this initiative represents a fulfillment of one of Aiyedatiwa's key campaign pledges to prioritize road infrastructure improvement.

"The governor's commitment to infrastructure development is evident, as investment in road projects plays a vital role in strengthening transportation networks, boosting economic activities, and enhancing the standard of living," Babalola remarked.

He further noted that contracts for asphalt overlay on 60 kilometers of roads throughout the state had been awarded in August 2024, and work has been underway for several months. "This reflects the governor's unwavering dedication to transforming Ondo's road infrastructure," Babalola added.

The projects span multiple areas, including Akure, Ondo, Owo, Ikare Akoko, Okitipupa, Ilaje, and Idanre, among others, underscoring the government's commitment to widespread development across the state.

MIDDLE EASTERN OIL PRICES RISE AS IRANIAN AND RUSSIAN SUPPLY DROPS

A decline in crude exports from Iran and Russia has driven up the value of Middle Eastern oil, with certain grades now trading at unprecedented premiums compared to Brent, the global oil benchmark. For instance, traders report that over the past two months, futures for Murban crude from the United Arab Emirates (UAE) have surpassed Brent in performance.

Similarly, Oman and Dubai crude prices have recently climbed to rare premiums over Brent, fueled by heightened demand in China and India. These two nations, traditionally major buyers of

IRAN AND RUSSIA FALLS

Iranian and Russian oil, have turned to Middle Eastern suppliers due to the diminished availability of crude from Iran and Russia.

Iranian oil has increasingly been stored in offshore facilities in Southeast Asia rather than delivered directly to customers.

This shift comes after a wave of U.S. sanctions targeting tankers transporting Iranian crude has made Chinese buyers more cautious. In October, the United States intensified its crackdown, introducing sanctions on entities and vessels involved in the transport and sale of Iranian oil.

Two months ago, the U.S. Treasury and State Department sanctioned companies from Suriname, India, Malaysia, and China for their role in transactions involving Iranian petroleum products. National Security Advisor Jake Sullivan highlighted that these measures also target the "Ghost Fleet," which secretly ferries Iran's oil to global buyers.

Russia's crude exports have also declined, with shipments by sea decreasing. This reduction stems from mounting pressure on Moscow to adhere to its OPEC+ production limits, designed to stabilize oil prices. Additionally, international sanctions targeting Russia's "shadow fleet" of tankers have further curtailed its export volumes.

Amid these changes, Saudi Arabia has regained a portion of the Asian oil market that it had previously lost to Russia. The Kingdom's oil exports to Asia have risen, while Russian crude sales in the region have dipped, as China and India, Russia's primary markets, have scaled back their purchases.

This shifting landscape underscores the growing demand for Middle Eastern oil as geopolitical pressures and sanctions reshape global crude supply and trade dynamics.

In October, the United States began ratcheting up sanctions on entities and vessels transporting Iranian oil. Two months ago, the U.S. Treasury and State Department designated several companies, based in Suriname, India, Malaysia, and China, for "knowingly engaging in a significant transaction for the purchase, acquisition, sale, transport, or marketing of petroleum or petroleum products from Iran."

Forecasts for Asphalt Advancements in 2025

: WHAT LIES AHEAD?

Recent years have witnessed remarkable progress in asphalt technology, and 2025 is anticipated to continue this trend. As sustainability, cost-effectiveness, and the durability of infrastructure take center stage, the asphalt sector is expected to adopt innovations that will redefine road construction and upkeep. Below is an overview of anticipated breakthroughs in asphalt technology for 2025, focusing on transformative advancements likely to influence the industry's trajectory.

1. Energy-Producing Roads with Electricity-Generating Asphalt

In 2025, energy-harvesting asphalt—once considered futuristic—may become more widely implemented. This concept involves incorporating piezoelectric materials into asphalt, enabling it to convert the mechanical pressure of vehicle movement into electricity. Although still under development in 2024, advances in

material science could make this groundbreaking technology commercially viable.

Envision roads that generate power as cars and trucks traverse them, supplying energy to streetlights, charging stations, or even nearby buildings. This innovation would not only provide a renewable energy source but also integrate roadways into urban energy grids, making them an active participant in sustainable energy systems.

2. Expansion of Smart Road Technology

The adoption of smart roads is expected to gain momentum in 2025, with increasing use of embedded sensors and IoT (Internet of Things) devices in roadways. These technologies will deliver real-time updates on traffic patterns, road conditions, and maintenance needs.

In 2025, major cities may implement smart road systems capable of providing drivers with instant notifications about congestion or accidents while also communicating directly with autonomous vehicles. By sending data to connected cars, smart roads will enhance safety, improve traffic flow, and reduce fuel consumption.

Additionally, these technologies will transform road maintenance practices. Sensors will detect minor defects, such as cracks or potholes, before they escalate, enabling predictive repairs. This approach will significantly lower long-term maintenance costs for municipalities and increase overall road safety.

3. Greater Use of Self-Repairing Asphalt

Although self-healing asphalt began gaining traction in 2024, its broader adoption is expected in 2025. This innovation aims to increase the lifespan of road surfaces while minimizing the need for expensive repairs. Materials like microcapsules containing rejuvenators or steel fibers activated by heat or electromagnetic fields will allow asphalt to mend minor damage automatically.

By 2025, highways and urban roads with heavy traffic could see widespread use of self-repairing asphalt, offering cost-effective and eco-friendly solutions. This technology will not only extend the durability of road surfaces but also reduce traffic disruptions caused by maintenance and cut down the environmental impact associated with frequent repairs.

pread use of self-repairing asphalt, offering cost-effective and eco-friendly solutions. This technology will not only extend the durability of road surfaces but also reduce traffic disruptions caused by maintenance and cut down the environmental impact associated with frequent repairs.

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4. Carbon-Negative Asphalt Becomes a Priority

The push for carbon neutrality is expected to lead to advancements in carbon-negative asphalt in 2025.

While carbon-absorbing asphalt gained attention in 2024, the next step involves developing materials that remove more carbon dioxide from the atmosphere than they emit during their lifecycle.

This innovation may leverage bio-based materials or advanced additives capable of binding carbon within the asphalt structure. Additionally, asphalt production facilities may adopt carbon capture and storage (CCS) technologies to curb emissions during manufacturing. As governments impose stricter environmental regulations, demand for carbon-negative asphalt is likely to surge, encouraging widespread adoption of sustainable infrastructure solutions.

5. Enhanced Recycling Processes for Asphalt

Recycled Asphalt Pavement (RAP) usage has steadily risen, but in 2025, advancements could make the recycling process more efficient and practical. Current challenges with using high percentages of RAP involve maintaining quality and performance on par with virgin asphalt. However, improved rejuvenators and mixing techniques might allow for 100% RAP utilization in high-stress applications like highways.

Moreover, closed-loop recycling systems could become the norm, where asphalt is entirely recycled onsite, cutting transportation costs and emissions. This method has the potential to revolutionize asphalt recycling by making it faster, more cost-effective, and environmentally sustainable.

6. Tougher Asphalt for Extreme Weather

As climate change intensifies extreme weather events, 2025 is expected to bring advancements in asphalt designed to endure such conditions. Ultra-durable asphalt formulations that withstand severe heat and freezing temperatures will be essential for regions grappling with erratic weather.

Innovations in polymer-modified asphalt with advanced additives could improve resistance to thermal expansion and contraction, reducing cracking. These materials will also offer superior elasticity, ensuring road surfaces remain intact despite heavy rains or shifting soil. Such durable asphalts will be particularly valuable for high-traffic highways, airports, and urban areas experiencing frequent weather-related challenges.

A New Era for Asphalt

The asphalt industry stands on the cusp of a transformative period. In 2025, the focus will be on sustainability, durability, and smart infrastructure. From roads that generate energy to weather-resistant materials, these advancements promise to reshape the construction and maintenance of roadways. As the world moves toward a greener, more interconnected future, innovations in asphalt technology will play a pivotal role in building smarter, more sustainable infrastructure.

THE EFFECT OF BITUMEN AGEING ON SURFACE RAVELING

Surface raveling is a prevalent functional issue that affects the longevity of bituminous pavement. To investigate this phenomenon, a comprehensive pavement study was carried out over a 36-month period on a major district road (MDR) in Telangana State, India. Field cores were extracted from the Bituminous Concrete (BC) pavement surface and subjected to laboratory testing for detailed analysis.

At the outset, the bulk specific gravity (Gmb) of the core samples was measured. Initially, one month after construction, the Gmb values were found to be between 91.1% and 92.9% of the maximum specific gravity (Gmm), with the binder content recorded at 5.4%.

By the end of three years, due to traffic-induced compaction, the field density had increased to a range of 94.1% to 95.3% of Gmm. Concurrently, the binder content had dropped to 4.5%, primarily because fine aggregates had been displaced, leading to raveling.

Further analysis of the BC cores revealed a change in aggregate gradation, reflecting the loss of fine particles. Examination of the bitumen binder properties extracted from the samples showed a similarity to bitumen aged artificially using the pressure ageing vessel (PAV), indicating that four years of service life resulted in significant ageing.

To evaluate the ageing gradient within the pavement layers, the field cores were divided into two sections: the upper and lower slices. Bulk density measurements were performed on both sections, and bitumen was separately extracted from the top and bottom slices to determine binder content. Laboratory tests assessed the extracted bitumen for non-recoverable creep compliance (Jnr) and binder fatigue life (Nf).

Results demonstrated that the upper slice had a higher Gmb, lower Jnr, and reduced Nf compared to the lower slice. These differences were attributed to more severe oxidative ageing in the upper layer, as it is directly exposed to environmental factors. Additionally, the binder content in the top layer was notably lower due to raveling on the pavement surface.

The study concluded that increasing the compaction level of the BC layer to 94% of Gmm, instead of 92%, can help mitigate binder ageing and prolong the service life of bituminous pavements.

Fluctuating Oil Prices

A SIGNIFICANT OBSTACLE FOR NATIONAL OIL COMPANIES IN 2025

WPB: The global energy sector is experiencing a profound shift, with oil and gas continuing to dominate the energy mix, even as renewable energy sources rapidly gain traction. The coming decade presents national oil companies (NOCs) with both substantial opportunities and significant hurdles. As they face fluctuating oil prices, escalating geopolitical challenges, and a rapidly advancing energy transition, NOCs find themselves at a critical juncture. Their capacity to address these multifaceted issues will shape their competitiveness, sustain their leadership role, ensure their nations' energy security, and influence the global energy dialogue over the long term.

Despite the accelerating growth of renewables, oil and gas are expected to remain central to the global energy mix in the near future. While global oil demand is predicted to reach its peak within the next ten years, projections suggest that more than half of the current daily oil consumption—approximately 105 million barrels—will persist until 2050. This ongoing demand provides NOCs with a certain level of stability, but they must contend with market conditions characterized by price instability, geopolitical unpredictability, and increasing calls for decarbonization.

One of the primary uncertainties facing NOCs in the short term is the future trajectory of oil prices. Market indicators suggest that 2025 might witness a scenario reminiscent of 2015, when an oversupplied market drove oil prices below $30 per barrel in early 2016. Anne Britt Høydal, Segment Director for Governments and NOCs, notes that if such trends materialize, OPEC nations could be compelled to enact significant production cuts to stabilize

prices. For NOCs, this scenario necessitates strategic flexibility and vigilant monitoring of market shifts to sustain profitability and long-term resilience.

Currently, NOCs hold a dominant position in the oil and gas industry, contributing half of the world's oil and gas output. Their control over some of the most cost-effective oil and gas reserves provides them with a competitive edge in a volatile market.

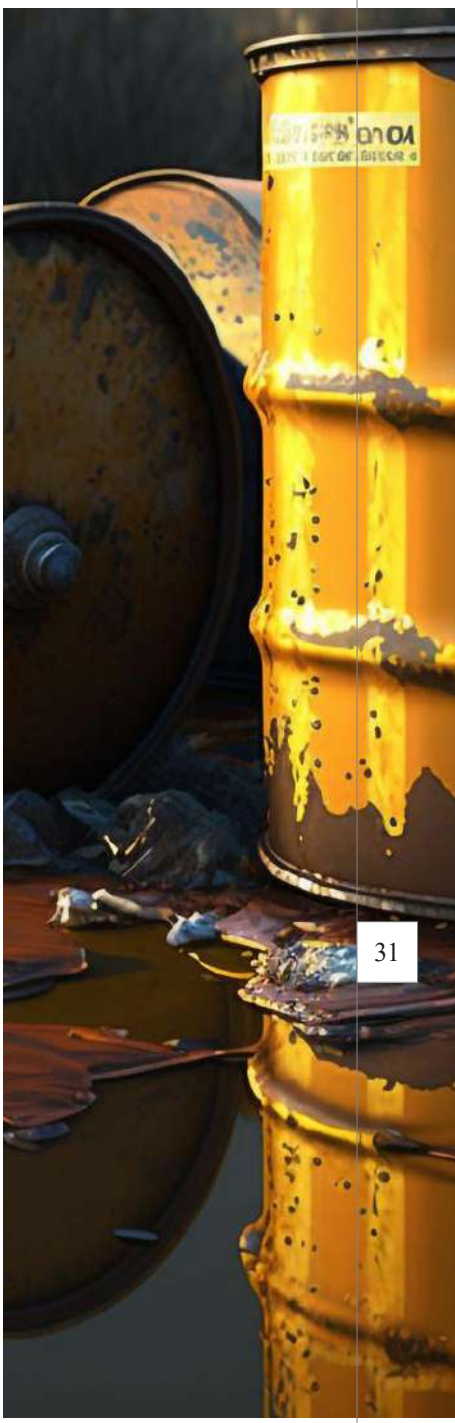
As the future of energy increasingly favors producers with low costs and minimal carbon footprints, NOCs are uniquely positioned to remain competitive. Many operate fields with exceptional cost

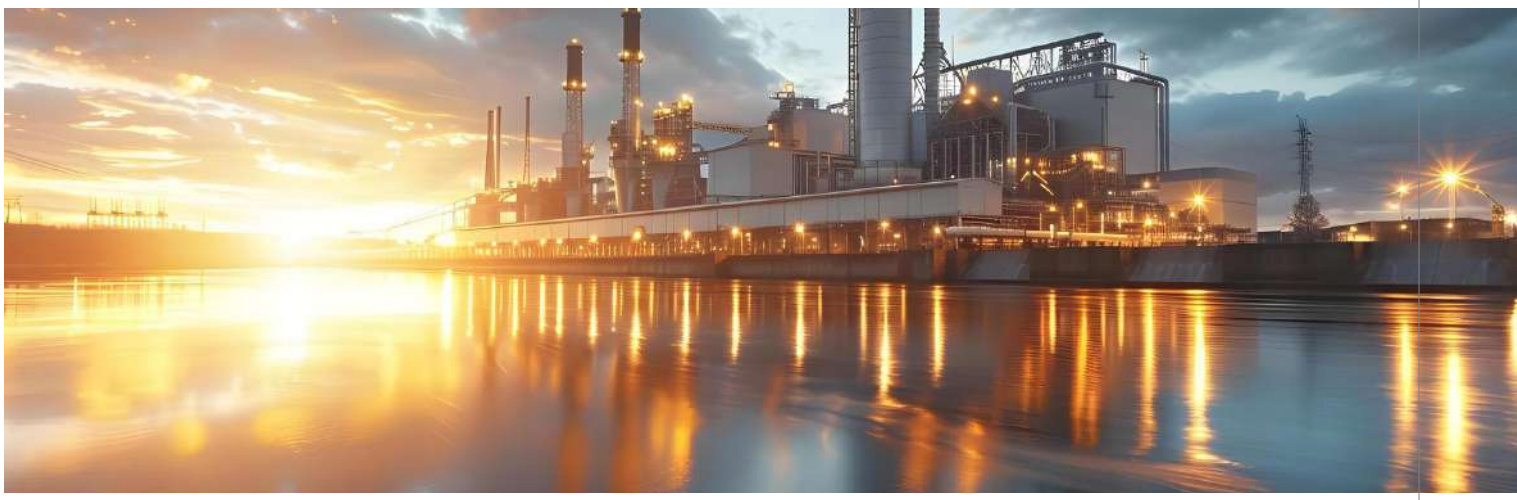
efficiency, enabling them to stay resilient amidst rising pressures to reduce emissions.

In recent years, many NOCs have expanded their operations internationally, driven by diminishing domestic reserves and growing global demand. Regions such as Africa, Asia, and South America have been key areas of focus, allowing NOCs to sustain production levels and solidify their status as global energy leaders. However, international ventures come with added complexities, including geopolitical risks, regulatory hurdles, and cultural challenges, which NOCs must navigate carefully.

The global push toward renewable and low-carbon energy, however, is a reality NOCs cannot overlook. Governments and corporations worldwide are increasingly committing to carbon reduction, leaving NOCs with no choice but to adapt or face irrelevance. To address this, many NOCs are diversifying their investments, channeling resources into areas such as solar, wind, and hydrogen energy. These investments help them reduce reliance on fossil fuels, explore new growth opportunities, and stay relevant in the evolving energy landscape.

The future trajectory of NOCs will hinge on their ability to strike a balance between maintaining traditional oil and gas production and embracing renewable energy. Successfully meeting current demand while preparing for a more sustainable energy future will be critical to their long-term success. For 2025, the core challenge for NOCs lies in navigating today's uncertainties while laying the groundwork for a competitive and sustainable tomorrow. Their adaptability, innovation, and leadership will not only determine their future but will also have a lasting impact on global energy security.





KEY SHIPPING NATIONS ENDORSE UNIFORM CARBON TAX

A coalition of prominent shipping nations has expressed support for implementing a uniform carbon tax on emissions from the maritime industry. Among them are Liberia and Panama, which oversee the largest shipping registries globally. Together with 43 other jurisdictions, they represent 66% of the world's total shipping tonnage and have collectively approved the proposed levy targeting shipowners. Despite opposition from countries like Brazil, China, and the United States, the broad backing enhances the likelihood of reaching an international consensus.

Shipping accounts for roughly 3% of global carbon emissions, placing it on par with the airline industry. Advocates believe that a fixed tax would incentivize shipowners to transition to low-emission fuels or adopt cleaner alternatives.

As one of the most efficient modes of transportation, shipping underpins the operations of global retailers like Amazon and Ikea, allowing goods to be transported swiftly and at low cost. This industry plays a vital role in sustaining the consumer lifestyle prevalent in the Global North. However, it has faced criticism for decades of minimal regulation. A climate policy specialist highlighted to The New York Times that international trade routes fall outside the authority of any single nation, contributing to this regulatory gap. A global carbon tax could potentially generate approximately $100 billion annually, which could be directed toward aiding developing nations in addressing climate change challenges. Meanwhile, Maersk, a leading container shipping company, expressed optimism that consumers would accept higher costs for eco-friendlier shipping options.

Unresolved tax specifics

Although discussions about the levy have been ongoing for years, the endorsement from Liberia and Panama is seen as a pivotal development, even without the support of key exporters like China. However, disagreements persist over the tax's specifics, particularly the rate to be imposed. Liberia has proposed a charge of $18.75 per ton of emissions, while the Marshall Islands—ranked third in global shipping registries and highly vulnerable to rising sea levels caused by climate change—advocate for a significantly higher fee of $150 per ton.

Low tax rates have historically attracted companies to register their vessels in countries like Liberia, but a shipping expert emphasized to the press that an effective energy transition would require levies ranging from $100 to $150 per ton. Additionally, incentivizing the use of Net Zero vessels would be critical to achieving substantial progress.

WPB: The base oil market in 2025 is set to undergo notable

JANUARY BASE OIL REPORT

transformations, shaped by evolving policies, advancements in technology, shifting demand patterns, sustainability goals, and the introduction of new product requirements. Industry participants are preparing for a year of significant adjustments.

End-of-Year Trends in 2024

The close of 2024 unfolded largely as anticipated. Expanding inventories, weakened demand, and lower crude oil and feedstock prices prompted most base oil manufacturers and rerefiners to implement price reductions between October 21 and November 25. These cuts ranged from 15 to 50 cents per gallon, depending on the supplier and product grade. Exceptions included API Group I bright stock and ExxonMobil's Group II 220 neutral grade. While ExxonMobil and Paulsboro revised prices for some Group I products, other producers in this category maintained stable rates due to well-balanced inventories and earlier price changes in September.

Such pricing adjustments are common at the year's end, as demand typically softens following a busy spring and summer season. Additionally, suppliers often aim to clear inventories held for hurricane season, which officially ends on November 30, by offering competitive posted and spot prices.

Downstream Market Dynamics

In the downstream sector, intense competition among lubricant manufacturers striving to retain or grow market share exerted downward pressure on lubricant, grease, and finished product prices. Several factors contributed to reduced base oil demand, including extended oil-change intervals for newer vehicle models, the gradual adoption of electric vehicles, and economic pressures delaying oil changes—particularly for heavy-duty vehicles and agricultural machinery. Blenders reported an 8%-10% drop in lubricant demand compared to 2023, which had already seen significant declines relative to 2020 levels. The steepest reductions were observed in the first quarter of 2024.

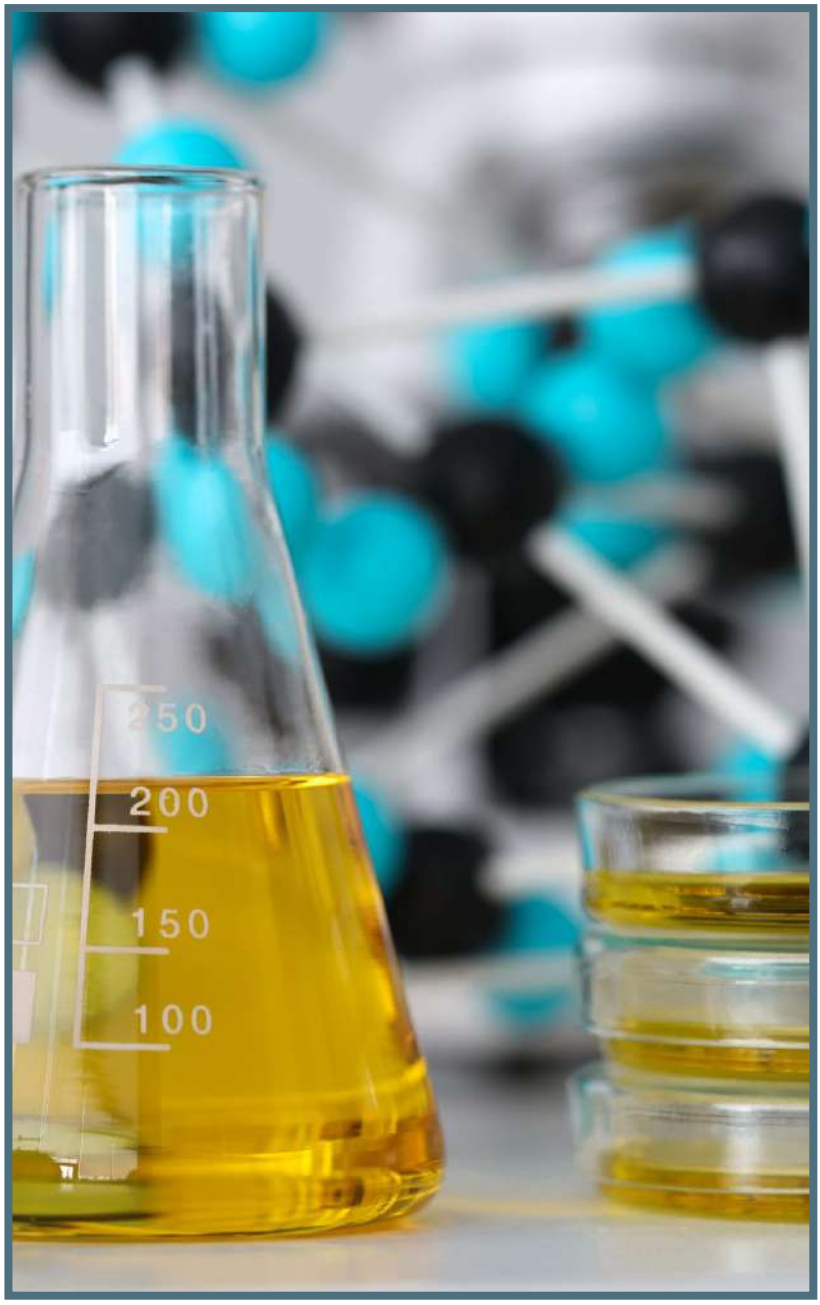
Supply Conditions Across Base Oil Groups

While Group I products ended 2024 with a stable supply-demand balance, Group II inventories began to lengthen

as additional shipments entered the market. However, a late-November shutdown of the Excel Paralubes Group II/III facility in Lake Charles, Louisiana, temporarily tightened supplies. Chevron's planned maintenance at its Group II plant in Pascagoula, Mississippi, during the first quarter of 2025, coupled with pre-maintenance inventory stockpiling, may further restrict Group II spot availability.

Group III base oil prices, on the other hand, stabilized in late November and early December due to reduced production at domestic facilities and hesitancy among suppliers to implement additional price changes. Competitive pricing between Group II and Group III products spurred interest in the latter, with most cuts considered widely available.

Ample supplies were expected to continue, supported by imports from South Korea and the Middle East.



Export Market Opportunities

Domestic base oil demand was not anticipated to rebound significantly before the first quarter of 2025, prompting suppliers to focus on export markets. While trade with Mexico remained steady, U.S. suppliers acknowledged a decline in shipments of light-viscosity grades due to Mexican government restrictions on base oils used as fuel extenders. However, premium-grade shipments for factory-fill applications continued, bolstered by Mexico's expanding automotive manufacturing sector. Exports to Brazil and India were expected to increase in December and January, driven by restocking needs and attractive U.S. pricing.

Naphthenic Base Oils and Sustainability Trends

On the naphthenic side, price pressure was less pronounced compared to paraffinic oils due to balanced supply conditions, particularly for light-viscosity grades.

Crude oil price volatility influenced costs but was offset by stable demand from sectors such as transformer oil production and infrastructure projects.

Heavier pale oil grades, though more abundant due to reduced seasonal demand from tire and rubber industries, saw producers maintaining firm price levels in anticipation of tighter market conditions in 2025.

Sustainability initiatives continued to drive interest in rerefining, with government policies and private investments supporting circular economy goals. Experts emphasized the need for stronger mandates on used oil recycling to encourage further investments in the U.S.

DEVELOPMENT OF RECYCLED ASPHALT BINDER USING ECO-FRIENDLY BIO-ADDITIVES

WPB: The rising demand for sustainable road construction has led to a focus on utilizing reclaimed asphalt pavement (RAP) as an alternative to virgin materials. However, the brittleness and stiffness of aged asphalt present challenges in achieving the desired performance. Traditional solutions, like synthetic polymer additives, improve asphalt properties but are costly and environmentally harmful. This research addresses these issues by introducing biodegradable, cost-effective bio-additives—starch (ST) and bone glue (BG)—to rejuvenate aged asphalt and enhance its durability.

RAP offers significant economic and environmental benefits but often exhibits reduced workability due to aging. Waste engine oil (WEO) has been used as a rejuvenator, softening the asphalt binder. However, its use compromises high-temperature rutting resistance, making additional modifications necessary. By combining ST and BG with WEO-treated asphalt, the researchers aimed to enhance high-temperature performance while retaining the environmental benefits of RAP.

Optimal proportions for the bio-additives were determined experimentally, with 0.75% ST and 0.5% BG (by weight of asphalt) providing the best results. These proportions improved rutting resistance, stability, and moisture resistance. Compared to virgin asphalt mixes, the bio-modified mix demonstrated significant performance enhancements, including a 62% reduction in rut depth and increased tensile strength.

The integration of ST and BG also improved cohesion within the asphalt, reducing air and water infiltration. These natural additives formed strong physical bonds with the binder, increasing viscosity and creating a denser, more uniform microstructure. Such properties make the bio-modified asphalt suitable for medium-traffic roads or binder layers in highways, where durability and cost-efficiency are critical.

Sustainability is a key advantage of this approach. The reuse of RAP, combined with biodegradable additives, reduces the demand for virgin materials, lowering energy consumption and greenhouse gas emissions.

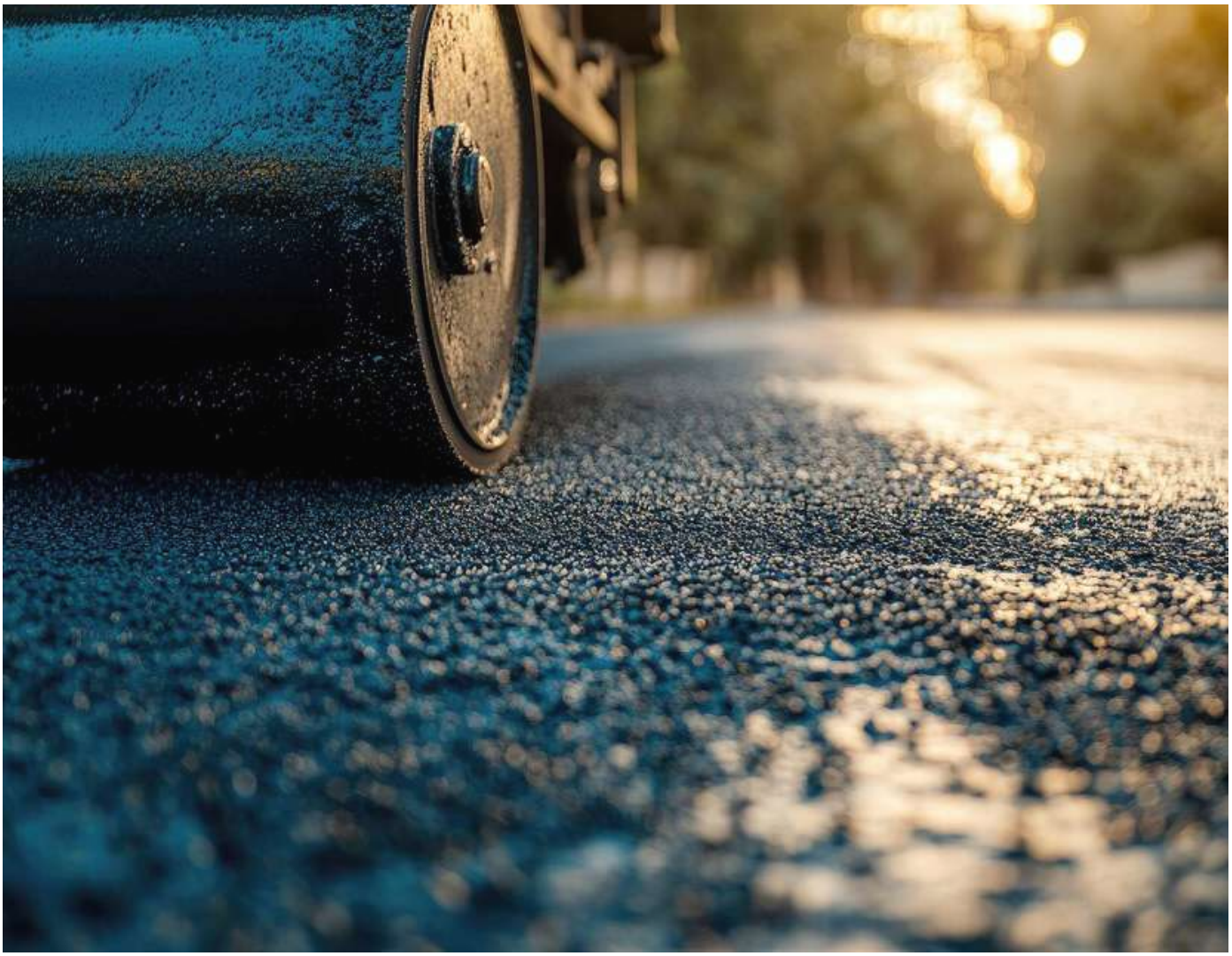
This not only conserves non-renewable resources but also minimizes construction waste, supporting global efforts for a greener environment.

Mechanical tests confirmed the durability of the modified asphalt, demonstrating superior resistance to rutting, cracking, and moisture-induced damage. The improved stability and reduced wear make the mix highly suitable for long-term road performance, even under challenging environmental conditions. While the mix performed exceptionally well in laboratory settings, further research is needed to evaluate its long-term performance in real-world applications.

The development of bio-modified asphalt represents a significant step forward in sustainable road construction. The natural additives ST and BG offer an eco-friendly alternative to synthetic polymers, combining economic benefits with improved mechanical properties. This approach aligns with global trends toward reducing the carbon footprint of industrial activities and promoting resource conservation.

Despite the promising results, certain limitations exist. Long-term performance assessments under traffic loads and diverse climatic conditions are essential for widespread adoption. Further studies using advanced testing methods, such as bending beam rheometers, could provide deeper insights into the mix's durability and aging properties.

The introduction of bio-additives like starch and bone glue demonstrates that sustainable infrastructure can be achieved without compromising performance. By enhancing the rheological and mechanical properties of RAP, this innovative approach provides a viable pathway for eco-friendly road construction. With continued research and refinement, these advancements could revolutionize the paving industry, blending environmental responsibility with engineering excellence.



VENEZUELA'S PETROLEUM EXPORTS REACH FOUR-YEAR HIGH

Venezuela's petroleum exports in October surged to their highest level in four years, driven by increased production and greater sales to India and the United States.

The rise in Venezuela's petroleum exports to 950,000 barrels per day in October occurred despite significant challenges, including a fire at a major storage terminal, intensified U.S. sanctions since June, and the arrest of Pedro Tellechea, the former petroleum minister and former director of the state petroleum company PDVSA, on corruption charges.

Documents from the state-owned PDVSA revealed that the improvement in petroleum production was largely due to the stabilization of refining activities in the Orinoco Belt, Venezuela's largest petroleum-producing region.

According to data based on tanker movements, PDVSA and its subsidiaries collectively exported 947,387 barrels per day of crude oil and fuel, marking a 21% increase from the previous month and reaching the highest monthly figure since early 2020.

This South American country, which has been under U.S. sanctions since 2019, also exported 315,500 tons of byproducts and petrochemical products in October, slightly up from 267,000 tons in September.

Venezuela's petroleum exports to the U.S., conducted by Chevron, reached 280,000 barrels per day — the highest since this American company resumed shipments of Venezuela's heavy crude early last year. In October, Spain's Repsol also shipped Venezuelan petroleum to the U.S. and Spain.

PDVSA increased exports to India, a major market before U.S. sanctions, sending three shipments totaling approximately 141,000 barrels per day.

Venezuelan petroleum exports to the U.S., Europe, and India are permitted under U.S. licenses granted to select customers and joint venture partners of PDVSA, including Chevron, Repsol, Eni, Maurel & Prom, and Reliance Industries.

Nevertheless, China remained the primary destination for Venezuelan petroleum exports in October, receiving 385,300 barrels per day directly and indirectly. In September, exports to China were higher, at approximately 451,500 barrels per day.

Venezuela's exports to Cuba, a political ally facing its own energy crisis, also saw a modest increase from 22,000 barrels per day in September to 28,000 barrels per day in October.

According to Reuters, Venezuela's fuel imports also rose from 67,000 barrels per day in September to 81,000 barrels per day in October.

KEY MARITIME TRENDS TO OBSERVE IN 2025

The maritime sector is at a pivotal point, balancing traditional practices with groundbreaking advancements. As 2025 unfolds, shipowners, operators, and managers are navigating a landscape filled with unique challenges and exciting opportunities. Whether it's integrating advanced technologies or adhering to stricter environmental mandates, staying ahead is now more essential than ever. Below are the most significant maritime trends shaping the industry this year.

1. The Surge of Digital Innovation

The rapid adoption of digital technologies is transforming fleet management. In 2025, the maritime sector is increasingly leveraging tools like the Internet of Things (IoT), artificial intelligence (AI), and blockchain to enhance operations and streamline decisions.

• IoT Integration: Ships are now equipped with advanced sensors that provide real-time data on fuel usage, equipment maintenance needs, and cargo conditions. This data enables predictive maintenance and reduces delays.

• AI-Driven Optimization: Sophisticated algorithms are being deployed to improve route planning, lower fuel consumption, and bolster safety protocols.

• Blockchain for Transparency: This technology is being utilized to ensure secure, transparent, and fraud-resistant procurement and supply chain processes.

Companies successfully adopting these technologies are experiencing notable cost reductions and competitive advantages. A study by Wärtsilä Marine Business found that around 66% of shipping firms have initiated their digital transformation, with 69% actively exploring additional digital solutions.

2. Heightened Focus on Environmental Regulations

With global sustainability targets becoming more ambitious, maritime operators are under mounting pressure to comply with new environmental rules. The International Maritime Organization (IMO) has set stringent emissions reduction goals to be achieved by 2030, making this a critical priority in 2025.

• Exploring Alternative Fuels: Cleaner options like LNG, biofuels, and hydrogen are gaining traction as the industry transitions to low-carbon operations.

• Energy-Saving Innovations: Technologies such as wind-assisted propulsion and air lubrication systems are being tested to improve efficiency.

• Carbon Offset Investments: Many companies are participating in carbon offset programs to meet immediate regulatory requirements.

For instance, a prominent French transport firm highlighted how revising maintenance strategies resulted in significant fuel savings and a reduction of 60,000 tonnes of CO_2 emissions annually.

3. Cybersecurity as a Strategic Imperative

As maritime operations become more digitally connected, cyber threats are growing in complexity and frequency. In 2025, safeguarding critical systems and data is a top priority.

• Enhanced Cybersecurity Measures: Companies are investing in secure software systems and providing IT training for crews to mitigate risks.

• Adherence to IMO Standards: Compliance with the IMO's cybersecurity guidelines (MSC-FAL.1/Circ.3) is crucial for maintaining operational safety.

A survey conducted in late 2024 revealed that 31% of maritime professionals had experienced at least one cyberattack within the past year, a significant rise from 17% over the previous five years. In 2023, cyberattacks in the maritime sector incurred an average cost of $3.2 million per incident.

4. Prioritizing Crew Welfare and Advanced Training

The COVID-19 pandemic brought renewed attention to the importance of crew welfare, a trend that continues to shape the industry in 2025. Shipping companies are focusing on initiatives to attract and retain skilled personnel.

• Improved Onboard Living Standards: Enhanced facilities and mental health support programs are becoming the norm.

• Modern Training Methods: Immersive tools like virtual reality (VR) and augmented reality (AR) are being utilized to provide more effective and engaging training for crew members.

5. Growth in Autonomous Shipping

While fully autonomous vessels remain a long-term aspiration, automation continues to revolutionize the maritime industry in 2025.

• Semi-Autonomous Solutions: Automated navigation systems and remote monitoring technologies are becoming standard features on modern ships.

• Developing Regulations: Authorities are drafting policies to govern autonomous operations, ensuring safety and compliance with international standards.

6. Strengthening Supply Chain Resilience

The disruptions of recent years have highlighted vulnerabilities in global supply chains, prompting maritime companies to prioritize resilience in their operations.

• Expanding Port Networks: Firms are diversifying their port calls to reduce dependency on single hubs.

• Implementing Smart Port Systems: Ports are adopting technologies like IoT, AI, and automation to optimize cargo handling processes and minimize delays.

Preparing for What Lies Ahead

The maritime sector is undergoing a rapid transformation, driven by technological progress, evolving regulations, and the push for sustainability. Organizations that proactively embrace these trends will be better equipped to tackle challenges and seize emerging opportunities in 2025.

By focusing on digital advancements, regulatory compliance, crew well-being, and innovative practices, maritime leaders can ensure their fleets remain competitive in this dynamic and evolving industry.

Comprehensive Overview of the Bitumen Market in 2025

WPB: The global bitumen market has witnessed steady growth over the years, driven by infrastructure development, technological advancements, and sustainability initiatives. From a market size of $55.85 billion in 2024, the bitumen industry is projected to grow to $58.12 billion in 2025, reflecting a compound annual growth rate (CAGR) of 4.1%. By 2029, it is expected to reach $71 billion at an even higher CAGR of 5.1%.

Key Drivers of Growth

1. Infrastructure Development and Road Construction

The increasing demand for road construction activities worldwide significantly boosts the bitumen market. Bitumen's role as a binder and its properties—such as waterproofing, flexibility, and weather resistance—make it indispensable in road-building projects. For example, government investments in infrastructure are creating massive opportunities:

- Australia's 10-year $12.04 billion (A$17.9 billion) infrastructure budget includes extensive road projects.
- In the United States, the $1.2 trillion Infrastructure Investment and Jobs Act (IIJA) is allocating $550 billion over the next decade for roads, bridges, airports, and railroads.

2. Rapid Industrialization

As economies shift from agrarian structures to industrialized systems, bitumen plays a crucial role in supporting infrastructure development. It is widely used in waterproofing and industrial processes, ensuring durability and reliability for industrial assets. Data from Eurostat indicates that industrial production in the euro area and the EU continues to grow, further driving demand for bitumen in construction and related applications.

Emerging Trends

The bitumen market is evolving rapidly, with several trends shaping its future:

- Sustainable Asphalt Solutions: The push for eco-

friendly construction materials has led to advancements in recycling and reusing bitumen.

- Bio-Based Bitumen: Companies like Tarmac are leading the way with algae-based bio-bitumen, a sustainable alternative that reduces the carbon footprint of road construction while maintaining durability and recyclability.

- Technological Innovations: Developments in nano and micro bitumen technology, digital production solutions, and high-performance materials are revolutionizing the industry.

- Smart City Initiatives: The rise of smart cities demands innovative bitumen applications for energy-efficient and sustainable infrastructure.

Challenges and Opportunities

While the market benefits from increasing investments, there are challenges related to environmental regulations and fluctuating oil prices. However, these challenges also open opportunities for innovation, particularly in bio-bitumen and advanced bitumen technologies.

The global bitumen market is poised for substantial growth, driven by infrastructure projects, industrialization, and sustainability efforts. With innovations like bio-bitumen and high-tech materials gaining traction, the industry is set to meet the evolving demands of construction and industrial applications. As governments and industries prioritize infrastructure investments, the bitumen market is positioned to play a pivotal role in global economic development.

Polymer-Modified Bitumen Market Update

The global polymer-modified bitumen (PMB) market is projected to experience remarkable growth, with its value anticipated to rise from USD 11.83 billion in 2024 to USD 19.17 billion by 2034. This represents a compound annual growth rate (CAGR) of 4.9% over the forecast period. The expansion is primarily fueled by the escalating demand for high-quality asphalt in road construction and maintenance. PMB's notable advantages, such as enhanced durability, better performance under extreme weather conditions, and superior load-bearing capacity, are key factors driving its widespread adoption.

Advances in PMB Research and Applications

In recent years, extensive research has been conducted on polymer-modified bitumen, focusing on its properties and applications. Over the past two decades, the modification of bitumen using various polymers—ranging from virgin to recycled polymers and their blends—has gained significant traction. Studies have employed diverse methods to evaluate the influence of polymer incorporation on bitumen characteristics, as well as the interactions and morphology of polymer-bitumen mixtures.

One area of interest is the sustainable application of PMB. Researchers have explored the use of recycled plastics as modifiers, aiming to minimize environmental impact. Utilizing waste plastics in road pavement construction not only reduces carbon emissions but also promotes eco-friendly building practices.

Additionally, recent findings have underscored the importance of the chemical composition of base bitumen in determining its suitability for polymer modification. The introduction of specific polymers and additives to enhance bitumen's base properties has occasionally resulted in unique, unexpected engineering behaviors in industrial and paving contexts.

Drivers of Market Growth

Several factors are propelling the growth of the polymer-modified bitumen market:

1. Demand for High-Performance Materials: The growing need for durable materials in road construction and repair is a major driver. PMB provides exceptional resistance to harsh weather conditions, including extreme temperatures, heavy rainfall, and freeze-thaw cycles, making it ideal for areas with challenging climates.

2. Environmental and Regulatory Compliance: The industry's shift toward advanced, environmentally friendly materials to meet stringent regulations is accelerating PMB's adoption. Its recyclability and longer lifespan contribute to reduced environmental impact compared to conventional bitumen.

3. Infrastructure Development in Emerging Economies: Rapid urbanization in developing regions is spurring investment in infrastructure projects, such as roads, highways, and airports, which require long-lasting materials like PMB.

4. Focus on Sustainability and Cost Efficiency: PMB's durability translates to lower maintenance and repair costs, aligning with the construction sector's growing emphasis on sustainability. Technological advancements in polymer blending have further expanded its applications beyond road construction to areas like roofing and waterproofing.

Competitive Landscape

The PMB market is highly competitive, with major players prioritizing customer satisfaction through reliable product quality, timely delivery, and robust technical support. To remain competitive, companies are heavily investing in research and development to innovate and optimize production processes.

Recent Developments

- AMT Techno: This organization supports the PMB industry with services related to production, application, and quality control, helping companies with research and development as well as process enhancement.
- Gulf Petrochem: A global leader in petrochemicals, Gulf Petrochem specializes in producing and distributing bitumen, including polymer-modified varieties, for road construction through its expansive distribution network.

Leading Market Players

Key companies dominating the PMB market include:

- Royal Dutch Shell
- IKA Group
- AMT Techno
- Gulf Petrochem
- Maruti Group

Market Segmentation

By Product Type:

- Thermoplastic Polymers: Ethylene vinyl acetate (EVA), ethylene methacrylate (EMA), polyethylene (PE), polypropylene (PP), and others.
- Thermoplastic Elastomers: Styrene butadiene styrene (SBS), styrene isoprene copolymer (SIS), butyl rubber (IIR), among others.
- Thermosetting Polymers: Epoxy resins, polyurethane resins, acrylic resins, and phenolic resins.

By Application:

- Roofing and piping
- Emulsions
- Paving
- Waterproofing
- Road construction

By Region:

The market spans North America, Latin America, East and South Asia, Western and Eastern Europe, and the Middle East and Africa.

This broad segmentation and ongoing innovation indicate a thriving future for the polymer-modified bitumen industry as it adapts to evolving demands and sustainability goals.

Germany Welcomes Its First Fully Electric Seagoing Ferry

BY WPB

Germany's inaugural all-electric seagoing vessel, a catamaran ferry named E-Kat, has successfully completed its acceptance trials and is now ready for service. This milestone highlights the growing potential of battery-powered vessels in maritime transport.

The E-Kat, designed and constructed by Damen Group, was launched on June 29 in Gorinchem, Netherlands. Initial test runs were planned for summer 2024, but the process faced minor delays. On January 15, AG Reederei Norden-Frisia, the ferry's operator, confirmed the successful completion of trials, alongside obtaining permits, insurance, and official approvals necessary for its operation.

The ferry's battery system, with a maximum capacity of 1,800 kW, has also undergone comprehensive testing, including full-power charging trials. The charging infrastructure at the Norddeich pier has been largely installed, ensuring seamless energy replenishment.

"All formalities are complete," stated Michael Garrelts, technical inspector at AG Reederei Norden-Frisia. "If weather conditions permit, the E-Kat will reach Norddeich within January."

Constructed from aluminum, the vessel measures approximately 106 feet (32.3 meters) in length and can accommodate up to 150 passengers. It has a payload capacity of 11,250 kg.

The ferry will connect Norddeich, located on Germany's North Sea coast, with Norderney, one of the East Frisian Islands. Operating at a cruising speed of 16 knots (and capable of reaching 19 knots), the journey time will be cut nearly in half to just 30 minutes. The ferry is expected to make up to eight round trips per day.

E-Kat is powered by twin electric motors, each producing 600 kW, and supported by two 75 kW electric bow thrusters. The Dutch company EST-Floattech provided the Octopus High Energy battery system that powers the ferry. Once docked, the vessel will recharge using shore power connections, with a full charge requiring just 28 minutes. This charge will suffice for a round trip across the 11-kilometer (7-mile) stretch between the port and the island.

According to Cal-Ulfert Stegmann, a member of the shipping company's board, the long-term objective is to achieve a closed-loop energy system. The company has already installed solar panels at its facilities in Norddeich and Norderney, and it is working to expand its charging infrastructure for electric vehicles at both locations.

E-Kat's deployment marks a significant step toward sustainable maritime transport, paving the way for greener innovations in Germany's shipping industry.

India Urges Middle East for New Crude Oil Pricing Amid Rising Shipping Expenses

India's major state-owned refiners have urged a Middle Eastern supplier to present alternative pricing options for crude oil. This request comes as India seeks to secure the most cost-effective oil supply amidst a surge in both oil and shipping costs caused by U.S. sanctions on Russia's oil trade.

Indian Oil Corporation, Hindustan Petroleum Corporation Limited (HPCL), and Bharat Petroleum Corporation Ltd (BPCL) have approached Abu Dhabi's state oil company, ADNOC, to request price quotes on a delivered-at-port (DAP) basis alongside the traditional free-on-board (FOB) method commonly used by Middle Eastern suppliers. Under DAP terms, the seller covers expenses such as shipping, insurance, and other logistical services, unlike FOB, where buyers assume these costs.

The U.S. sanctions on Russian oil tankers, trading firms, and insurers have triggered a sharp rise in freight rates, doubling them within a week. Simultaneously, oil prices have climbed to a four-month peak. For India, which relies on imports for more than 80% of its daily crude consumption, the combination of escalating costs and the diminishing availability of discounted Russian oil has put significant pressure on refiners. Indian buyers are avoiding tankers specifically targeted by U.S. sanctions, further complicating procurement.

In response, Indian refiners are turning to the Middle East for more economical alternatives. They have requested ADNOC to offer DAP price quotes and plan to extend similar negotiations to Saudi Aramco. A source involved in the matter explained, "We want our term supplier to provide both FOB and DAP pricing. There's a chance that DAP could result in better overall costs, especially with freight charges expected to rise further."

Currently, India has been importing Russian crude on a DAP basis. Since Russia's invasion of Ukraine and the ensuing sanctions, Russia has emerged as the largest crude supplier to India, the world's third-largest oil importer. However, selling crude on a DAP basis is a rare practice among Middle Eastern producers like ADNOC.

Decline in UK Demand for Bitumen: A Persistent Trend

UK bitumen consumption falls 20pc on year

The United Kingdom has experienced a significant decline in bitumen consumption, with demand falling by nearly 20 percent in the third quarter of 2024 compared to the same period last year. Data from the UK Department for Energy Security and Net Zero (DESNZ) indicate a 10.4 percent reduction in bitumen use during the first nine months of 2024 compared to the same timeframe in 2023, extending a downward pattern that has persisted since 2021.

In the third quarter of 2024, bitumen consumption amounted to 351,000 tonnes, reflecting a 19.5 percent decrease from the corresponding period in 2023. Over the January-to-September period, total consumption dropped to 1.18 million tonnes. This decline aligns with broader market trends observed over recent years. Between 2021 and 2023, domestic consumption of bitumen in the UK shrank by 16.4 percent, accompanied by a substantial 41.5 percent decrease in production.

Despite the continued contraction in demand, bitumen production in the third quarter of 2024 increased by 6.7 percent year-on-year, reaching 131,000 tonnes. Cumulatively, production for 2024 (up to October) rose by 27.3 percent compared to the same period in 2023, reaching 425,000 tonnes.

The reduction in bitumen consumption forms part of a larger downward trend affecting the UK's petroleum product sector. Between 2018 and 2023, domestic deliveries of petroleum products dropped by 11.6 percent, while total production fell by 13.9 percent.

Currently, the Eastham refinery is the sole operational facility producing bitumen in the UK, following the cessation of bitumen production at the Lindsey refinery in 2023. However, the decline in UK bitumen production predates this, with a consistent decrease recorded since 2006, leading to increased reliance on imports to meet domestic demand.

Looking ahead, new developments in infrastructure may shape the market. Construction firm Tarmac announced in December that it plans to begin receiving bitumen shipments at the Dagenham terminal in southeast England by late January. The terminal, which has a capacity of 20,000 tonnes, is operated by Puma Energy, a subsidiary of Trafigura.

Nevertheless, market analysts predict that demand for bitumen will remain subdued due to ongoing financial constraints on public infrastructure projects. This outlook, combined with the broader economic pressures on the UK government, suggests that highway spending and construction activity may remain sluggish in the near term.

Wind-Powered Ships: A Modern Solution Inspired by the Past

A revolutionary shift is underway in oceanic cargo ship operations, with an old technology gaining renewed prominence. The Grain de Sail II, a French cargo schooner, serves as a prime example of how revisiting traditional methods can pave the way for a sustainable future in transportation.

Interestingly, the evolution of maritime power has come full circle. Coal once replaced wind energy, only for diesel engines to dominate the industry. However, as the global shipping sector seeks to curb the carbon emissions generated by thousands of vessels traversing the seas daily, wind power is emerging as a viable alternative. Ships like the Grain de Sail II are already demonstrating how wind can be harnessed to drive this change.

Constructed by the French Piriou shipyards in Brittany and in Ho Chi Minh City, Vietnam, the Grain de Sail II is a 170-foot schooner designed to transport up to 350 tons of cargo. As reported by Tech Xplore, it relies exclusively on wind power while navigating open waters. A diesel engine is used only for maneuvering in and out of ports, highlighting a cleaner and more sustainable approach to cargo shipping.

According to NPR, cargo ships currently transport approximately 90% of the world's goods, contributing to about 3% of global annual carbon emissions. The International Council on Clean Transportation warns that these emissions could rise by 50% by 2050. With rising fuel prices and regulatory efforts from organizations such as the United Nations and the European Union to discourage carbon-based shipping, wind energy offers an attractive and environmentally friendly alternative.

This trend is not limited to smaller vessels like the Grain de Sail II. Larger ships are also testing wind-powered technologies. The Pyxis Ocean, a 751-foot bulk carrier managed by Cargill, employs rigid fiberglass sails to generate lift and propulsion. Meanwhile, the Sea Zhoushan, a 1,115-foot cargo ship, uses innovative rotor sails—vertical cylinders that spin with the wind and harness the Magnus Effect to create forward thrust.

Yann Jourdan, captain of the Grain de Sail II and a former crew member of traditional diesel-powered ships, is a staunch advocate for greener maritime solutions. He believes his ship is a vital step toward transforming an industry heavily reliant on fossil fuels.

"Our mission is to show that it's achievable," Jourdan said. "It's just common sense—petroleum resources are finite, but the wind is limitless."

With its sophisticated design and reliance on renewable energy, the Grain de Sail II is not only a testament to innovation but also a beacon for a cleaner future in global shipping.

U.S. Asphalt Market Outlook 2025

bally, unpaved roads account for about 4.5 million kilometers, with the U.S. contributing over 2 million kilometers to this total.

Despite the market's positive drivers, challenges such as sustainability and environmental concerns hinder growth. The chemical properties of asphalt cause it to harden rapidly after application, which reduces its long-term durability. While this hardening process minimizes temperature sensitivity to a certain extent, it can lead to a preference for concrete over asphalt, limiting market expansion.

Product Trends

Modernization of pavement technologies has become a notable trend in the asphalt market. Porous asphalt is gaining popularity due to its cost-effectiveness and ability to manage water flow efficiently. Paving products currently dominate the market, accounting for more than half of asphalt consumption, and are expected to maintain their leading position through the forecast period.

Demand for asphalt in roofing products is anticipated to grow moderately, driven by increased expenditures on construction activities. Roofing applications, such as asphalt shingles and modified bitumen products, play a significant role in this growth.

Application Overview

Asphalt is primarily used as a binder in road construction, combining with aggregate to form asphalt concrete. Other applications include the production of roofing felt and bituminous waterproofing products.

Global demand for asphalt is projected to grow steadily due to increased construction activities, particularly in emerging economies like China, India, and Brazil. Key contributors to this growth include paving products such as asphalt cement, emulsions, and cutback asphalt, as well as roofing products like shingles, membranes, and mopping asphalt.

End-User Insights

The residential construction sector is expected to experience rapid growth, as high demand for asphalt shingles in standalone housing projects drives this segment.

Additionally, the use of recycled asphalt pavement is anticipated to boost demand for asphalt emulsions. In the non-residential construction market, rising expenditures are expected to fuel demand for low-slope roofing products such as roll roofing and modified bitumen membranes.

Regional Analysis

North America is expected to lead the global asphalt market through the end of 2025, driven by the expansion of the transportation and construction sectors. The extensive road networks in the U.S. and Canada significantly contribute to this growth. Furthermore, rising use of asphalt in roofing applications is projected to support market expansion.

The U.S. alone accounts for more than 2 million kilometers of unpaved roads. Meanwhile, countries such as China, Canada, and India are experiencing increased demand for paved roads due to urbanization and industrialization, positively influencing global asphalt consumption.

Competitive Landscape

Prominent market players include Aggregate Industries, Akzo Nobel, Anglo American, Atlas Roofing, China Petrochemical Corporation (Sinopec), El Dorado Chemical, Inland Asphalt, and United Refining.

Rejuvenation for Roads:
BAM Explores How Asphalt Can Be Reused More Frequently

The Federal Institute for Materials Research and Testing (BAM) is investigating, as part of a project funded by the German Research Foundation (DFG), how biobased rejuvenators can enable asphalt to be reused more frequently and sustainably. Currently, a significant percentage of asphalt material is reused in road construction. However, this often requires increasing the proportion of fossil-based bitumen, and the reuse of reclaimed asphalt is currently limited to only a few cycles.

Road and highway asphalt layers need to be renewed approximately every 15 years, depending on the level of wear and design. While a high proportion of reclaimed asphalt is already being reused in these processes, the reused material tends to become hard and brittle over time, which can lead to cracks and other surface damages. With each reuse, this tendency worsens. As the use of reclaimed asphalt increases in road construction, the otherwise desirable high reuse rate exacerbates the problem.

The DFG-funded project "Postcarbon Road," conducted in collaboration with BAM, Ruhr University Bochum, and the Technical University of Berlin, aims to create an unlimited reuse cycle for asphalt. Instead of relying on fresh bitumen, biobased rejuvenators—so-called "rejuvenators"—are being developed to keep asphalt elastic.

Fresh Bitumen Worsens the Carbon Footprint

Currently, fresh bitumen is added to reclaimed asphalt to counteract unwanted hardening. Bitumen, a fossil-based binder derived from petroleum, must be added in increasing amounts during each reuse cycle to maintain the asphalt's viscosity and elasticity. However, the permissible bitumen content in asphalt is limited. Moreover, this process worsens the CO2 footprint of reclaimed asphalt with every cycle.

Biobased rejuvenators, such as oils derived from pine resin or cashew shells, offer a potential solution. Preliminary studies have shown, however, that their positive effects are limited to a maximum of four reuse cycles. "We aim to push these boundaries and demonstrate how sustainable rejuvenators can significantly extend the reuse of asphalt," explains Sandra Weigel, an expert in road construction binders who leads BAM's work on the DFG project.

Custom-Designed Biobased Rejuvenators to Preserve Asphalt

The researchers are developing a specially modified biobased rejuvenator to act as a substitute for fresh bitumen's rejuvenating effects. The key to long-term effectiveness lies in how well the rejuvenator mixes with the existing aged bitumen in the asphalt. Only with near-complete mixing can viscosity and elasticity be maintained over time.

"Until now, it has not been possible to reliably determine the degree of mixing, making it difficult to tailor the rejuvenator effectively," says Sandra Weigel. "We are utilizing infrared spectroscopy and, for the first time, infrared light guides to essentially look inside the mixture and gain a highly precise chemical understanding of the material."

Through this approach, the researchers aim to demonstrate how sustainable rejuvenators can be precisely adapted to the composition of reclaimed asphalt, enabling its reuse as often as possible without negatively impacting the CO2 balance.

Fungi Pave the Way for Eco-Friendly Asphalt

In Denmark, eco-conscious bicycle paths, parking areas, and roads will soon feature a sustainable innovation derived from mushrooms. A Danish biotech firm, Visibuilt, has developed a fungi-based alternative to fossil-fuel-based bitumen. Based in Copenhagen, the startup recently secured €1.3 million ($1.36 million) in funding from Denmark's BioInnovation Institute to produce a biorenewable, fermentation-driven pavement binder.

Traditionally, roads have relied on bitumen—a petroleum product obtained during crude oil refinement—to bind sand and gravel into durable surfaces. Visibuilt, however, aims to replace this petroleum derivative with mycelium, the intricate root system of fungi.

The demand for bitumen is immense, as nearly 90% of global roads are constructed with asphalt. According to data from the International Bitumen Emulsion Federation, global bitumen consumption in 2022 reached approximately 120 million tonnes.

Visibuilt's founder, Line Kloster Pedersen, a food technology entrepreneur, conceived the idea of using fungi for road construction while jogging on mycelium-rich forest trails in Denmark. Inspired, Pedersen began experimenting with wood-decay fungi sourced from Danish woodlands to create a mycelium-based binder.

Considering that European road projects often incorporate up to 30% recycled asphalt, Pedersen also needed to ensure that the fungi could thrive even when mixed with bitumen. Within six months, she successfully developed a patentable binder.

The creation process for this binder, known as visiBIT, involves introducing mycelium to a substrate that serves as its nutrient source. This mixture is then placed

in a bioreactor to encourage growth. Once ready, the visiBIT binder is sent to asphalt factories, where it is combined with recycled asphalt and rocks.

Producing visiBIT is more energy-efficient compared to traditional bitumen. Manufacturing bitumen requires refining crude oil at temperatures of 400 °C and maintaining it at 165 °C to ensure its adhesive properties. In contrast, visiBIT production avoids extreme heating, requiring only brief substrate sterilization to eliminate contaminants. Pedersen notes, "We can construct pavements at room temperature, which is highly innovative for road building."

Road construction using visiBIT follows the same methods as with bitumen. However, unlike bitumen roads, which solidify within a day, those made with visiBIT take two weeks to cure. This delay is due to the time needed for the living mycelium to develop a mesh-like structure around the aggregate. Once the curing process is complete, a patented technique halts the mycelium's growth.

Visibuilt isn't alone in exploring greener alternatives to bitumen. In 2022, the Dutch company Miscancell used lignin—a natural adhesive in plant fibers derived from elephant grass (Miscanthus giganteus)—to develop a sustainable binder for roads. Similarly, in 2021, French engineering firm Colas created Vegecol, a pavement material made from plant oils and pine resin.

Visibuilt has already partnered with NCC, Scandinavia's largest asphalt producer. The company plans to integrate visiBIT into bicycle lanes and parking lots by 2026, with roads expected to adopt the innovation by 2028.

India's Bitumen Demand Outlook Shows Mixed Signals

India's bitumen consumption in 2025 presents a complex picture, as persistent delays in state government funding are expected to continue impacting demand, while numerous unfinished infrastructure projects could drive consumption higher.

As a net importer, India remains the largest consumer of Middle Eastern bitumen, particularly from Iran. In both 2022 and 2023, India's bitumen consumption reached record levels, surpassing 8 million t/yr. This growth occurred despite ongoing payment delays, as suppliers extended unusually long credit terms to road contractors.

"The challenge isn't demand itself but the availability of funds," an Indian importer explained. Contractors are increasingly requesting credit due to delays in fund disbursement by state governments. While demand is not declining, significant growth in 2025 is unlikely, with consumption expected to remain steady compared to 2024.

Importers have been under pressure to offload inventory, offering substantial discounts to clear stock. This has squeezed profit margins, especially as procurement costs have risen amid Iran's supply constraints. However, a backlog of delayed projects suggests that demand could be sustained once funding issues are resolved.

Refiners Expect Minimal Growth in Consumption

Some state-owned refiners foresee only a slight increase in bitumen consumption next year. To attract buyers, refiners have already been forced to sell at reduced prices, cutting into profits. This trend is likely

to persist into 2025, potentially pushing refiners to scale back bitumen output in favor of more profitable petroleum products. Typically, Indian refiners produce about 5 million t/yr, accounting for 55-60% of the country's total consumption.

"A 3-4% year-on-year growth is the most we expect since no major new road projects have been announced," said a source linked to a state-owned refinery. "While imports may rise if domestic production is reduced, overall market conditions won't be exceptional, and there are no plans to expand bitumen production capacity."

This outlook casts doubt on the central government's forecast of a 14% rise in bitumen demand, which is expected to reach 10 million t by the end of the current financial year in March 2025.

Middle Eastern Supply Constraints

Bitumen supply from the Middle East remains uncertain. In Iran, disruptions in vacuum bottom feedstock supply and logistical delays in transporting materials from national refineries to private bitumen producers are expected to persist, tightening supply. This will drive up export costs, particularly for VG40-grade bitumen, a key import for India.

Limited supply has also led to congestion at Iran's Bandar Abbas port, raising demurrage costs for importers and shipowners, which in turn dampens demand. Market participants are also concerned about the potential return of Trump-era sanctions or other geopolitical actions against Iran in 2025, further complicating the export landscape.

Adding to the uncertainty, Iran's central bank recently announced the gradual phase-out of the Nima foreign exchange platform. As a result, traders will now negotiate exchange rates directly, introducing further volatility in the Iranian rial's value against the US dollar. Meanwhile, Iraq's recent decision to restrict the flow of oil and petroleum products into Iran—unless approved by state-owned Somo—could reduce the supply of drummed bitumen. Most bitumen producers in Iran lack a Somo license, which could affect the transshipment of Iraqi bitumen through Bandar Abbas. Elsewhere in the region, Bahrain's recent expansion of its Sitra refinery from 267,000 b/d to 380,000 b/d is expected to boost output of middle distillates and naphtha at the expense of bitumen production.

Shifts in Bitumen Trade Flows

During periods of low demand in India, Middle Eastern bitumen cargoes are often diverted to Southeast and East Asian markets. In 2022, seaborne bitumen prices in Asia surged to multi-year highs, increasing the demand for competitively priced Middle Eastern bulk shipments, a trend that continued in 2023. However, in 2024, demand from Asia has primarily come from China and Vietnam, as other buyers have preferred regionally sourced cargoes due to specification compatibility and logistical advantages.

"The arbitrage window between the Middle East and Asia is effectively closed," a Southeast Asia-based trader noted. "We are unlikely to see any significant shipments from the UAE to Asia, as Middle Eastern cargoes are no longer competitively priced compared to regional alternatives, especially given Iran's ongoing supply and logistical challenges." With uncertainties surrounding both demand growth and supply constraints, India's bitumen market in 2025 is set to face a delicate balance between infrastructure needs and financial and geopolitical pressures.

VolvoCE Unveils their Next-Generation 32-ton Excavator in South Korea

n a high-energy customer event attended by over 500 industry professionals, Volvo CE showcased its latest innovation, complete with live demonstrations, operator training, and hands-on experiences.

This event underlined Volvo's dedication to delivering machines tailored to the evolving demands of the construction industry, with a special focus on the Korean market.

Setting the Stage in Korea
Volvo CE hosted the multi-day event in Korea, which brought together 530 customers from across the construction industry. The interactive experience allowed attendees to get up close and personal with the EC300, asking questions, engaging with product experts, and sharing valuable feedback.

Jinhwan Kang, Volvo CE's Product Manager, kicked things off with an in-depth introduction to the EC300, highlighting its advanced features and unique capabilities. Live demonstrations and operator training sessions followed, offering a tangible look at how this excavator operates in real-world scenarios. The excitement was palpable as attendees praised the machine's enhanced operating speed, improved fuel efficiency, and the smooth synergy between the boom and arm.

Hojin Kang, Head of Technology at Volvo CE's Changwon facility, expressed his enthusiasm, stating: "The New Generation EC300 is a testament to Volvo's commitment to innovation and customer satisfaction. We are excited to bring this advanced machine to our customers in Korea and are confident it will exceed their expectations."

VolvoCE Unveils their Next-Generation Excavator in South Korea
New Generation Excavator EC300 Excavator.
Meeting the Needs of Korea's Construction Market
The EC300 is a perfect match for Korea's robust construction industry, addressing critical needs in road building, quarrying, recycling, and general construction. Designed with the market's unique challenges in mind, the machine is built to thrive in demanding environments while maintaining efficiency and operator comfort.

Volvo CE plans to continue the momentum by hosting a Customer Experience Day at its Changwon facility later this year. This event aims to deepen customer engagement, further reinforcing Volvo's reputation for excellence in the Korean market, where annual demand for excavators like the EC300 hovers around 1,000 units.

Key Features of the New Generation EC300
Unmatched Performance and Power: At the heart of the EC300 is the Volvo D8M engine, a robust powerhouse delivering exceptional torque even at low RPM. This ensures a quieter, smoother, and more comfortable operation. Advanced heat management technology and reduced vibrations make long hours on-site less taxing for operators.

Operator-Centric Design: Volvo has reimagined the EC300's design, lowering the rear height by 100mm and increasing counterweight by 300kg to improve stability. The operator's cab is nothing short of a control centre, featuring HD monitors, integrated cameras, and deluxe seats. Safety and convenience are prioritised with features like heated mirrors, an emergency stop button, and joystick controls.

Cutting-Edge Technology: The EC300's fully electro-hydraulic control system offers unmatched precision with 10 working modes, auto power boost, and functions like boom and arm shock reduction. Optional smart packages, including Dig Assist and Volvo Active Control, take productivity to the next level. Safety is also a key focus, with human-object recognition alarms and Volvo Smart View technology ensuring a secure work environment.

Driving Innovation with Customer-Centric Solutions

Volvo CE's introduction of the EC300 in Korea underscores its commitment to delivering innovative solutions that cater to specific market needs. Customers have lauded the machine's design, ease of maintenance, and advanced functionality, positioning it as a game-changer for the Korean construction sector.

The EC300's features are tailored to enhance productivity while reducing operational costs. Smart capabilities, such as auto power boost and priority boom functions, streamline complex tasks, enabling operators to work faster and more efficiently. These advancements are not just about making the job easier—they're about transforming the way the construction industry approaches excavation.

VolvoCE Unveils their Next-Generation Excavator in South Korea

Customers gather in front of the New Generation EC300.

Strengthening Volvo's Legacy

For Volvo CE, the EC300 represents more than just a new product—it's a statement of intent. With features that prioritise safety, efficiency, and operator comfort, the machine is poised to solidify Volvo's position as a leader in construction equipment.

The positive feedback from the Korean market is a testament to the company's ability to innovate and adapt to customer demands. Hojin Kang highlighted this, saying: "We are confident the EC300 will continue to strengthen our brand reputation and set new standards in the industry."

Transformation in Korea

With the EC300 now making waves in Korea, Volvo CE's focus on customer engagement and innovation remains steadfast. The planned Customer Experience Day in Changwon will provide an even deeper dive into the machine's capabilities, offering further opportunities to connect with industry professionals.

This unveiling is just the beginning of what promises to be a transformative chapter for Volvo CE in Korea. By blending advanced technology with customer-centric design, Volvo is not only meeting expectations—it's raising the bar.

Turkey Shows Interest in Syrian Energy Sector

WPB: Turkey has expressed a desire to play a role in rebuilding Syria's oil and gas industry, according to remarks made by Turkey's energy minister.

In a recent statement to the press, Alparslan Bayraktar revealed that Turkey is actively working to support Syria's electricity infrastructure and is exploring opportunities to extend its involvement to oil and natural gas.

"We are evaluating ways to utilize crude oil and natural gas for Syria's reconstruction," Bayraktar stated. "Our aim is to propose how we can contribute to these efforts and move these projects forward."
Bayraktar also mentioned potential plans to establish new oil and gas pipeline connections between the two countries.

Syria has been grappling with challenges in its energy sector due to U.S. sanctions and ongoing conflicts with rebel factions. Previously, its main crude oil suppliers were Iran and Iraq. However, after the recent ousting of the Assad government, Iranian oil shipments to Syria have ceased. Reports indicate that one tanker even reversed course before reaching Syria following the regime change.

Iran had been supplying approximately 60,000 barrels of crude oil daily to Syria. Meanwhile, Syria's domestic production, primarily from fields in the eastern region under the control of the Kurdish-led Syrian Democratic Forces, stands at roughly 80,000 barrels per day.

Iraq, too, has stopped its oil deliveries to Syria as of early December, according to an Iraqi parliament member. Syria had relied on around 120,000 barrels per day of crude imports from Iraq, and this suspension has left the country facing a significant shortfall.
The situation has been further complicated by the disruption of internal crude transfers from eastern Syria to areas controlled by the Hay'at Tahrir al-Sham group, formerly considered a terrorist organization and previously linked to Al Qaeda during the Syrian civil war.

India Strengthens Road Network: MRPL Begins Operations at Advanced Bitumen Facility in Mangaluru

Mangalore Refinery and Petrochemicals Limited (MRPL) has officially started operations at a modern bitumen manufacturing unit in Mangaluru, utilizing the state-of-the-art 'Biturox' technology created by an Austrian company.

This new facility, as outlined by MRPL, can produce up to 1,50,000 metric tonnes of bitumen annually, effectively doubling its previous capacity. With this expansion, MRPL is poised to play a crucial role in meeting the needs of India's expanding highway infrastructure, which is vital for the nation's economic development.

"Our plant is tailored to deliver high-quality VG40 bitumen consistently, with the flexibility to produce VG30 and other grades based on industry requirements," shared BHV Prasad, Executive Director (Projects) at MRPL, in a statement.

India's growing highway network has long depended on imported bitumen to meet surging demand. Recognizing this challenge, MRPL initiated an expansion plan in 2022, which has now resulted in the construction of this world-class facility, the company revealed.

The Mangaluru plant aims to supply local road construction companies with premium, locally produced bitumen, supporting the vision of Atmanirbhar Bharat by reducing reliance on imports.

Developed by Engineers India Limited (EIL), the facility is a milestone for both MRPL and India's infrastructure growth, according to the statement.

"This new bitumen production plant marks a significant achievement for both MRPL and the region," Prasad remarked. "Equipped with advanced technology and driven by a strong commitment to quality, we are prepared to deliver bitumen that ensures durable and sustainable roads. This cutting-edge plant underscores MRPL's contribution to India's development journey."

Strategically situated in Mangaluru, the new facility is set to address the rising demand for bitumen in road construction, reduce dependence on imported products, and support the creation of long-lasting infrastructure across the nation, the company emphasized.

RUSSIA'S OIL TRADE WITH CHINA AND INDIA HALTED

China and India have suspended their oil purchases from Russia for March due to the latest U.S. sanctions, which have increased shipping costs.
According to ISNA, the U.S. Department of the Treasury, earlier this month, imposed a broad sanctions package aimed at weakening Moscow's energy revenues, targeting 183 vessels, including oil tankers from Russia's shadow fleet used to circumvent the G7 price cap.

As a result, the shipping cost for Russia's Urals-grade oil on Aframax tankers, which have a capacity of about 100,000 tons, has increased to $6.5–7.5 million for deliveries to China and $9–10 million for deliveries to India.

The proposed sale price of Urals oil to China in March was three to five dollars higher than the price of Brent oil, which was trading at $77.30 per barrel as of mid-Tuesday.

Vatsa Ramakrishna Gupta, the CFO of Bharat Petroleum Corporation of India, said last week that Indian refineries had not yet received new offers for March deliveries from traders dealing in Russian oil.
Despite these sanctions, tankers previously blacklisted by the U.S. are still unloading oil in China and India within the given deadline, but unloading at some ports has been delayed.

The U.S. sanctions package provides a grace period that allows sanctioned vessels to unload Russian oil by February 27 and complete energy-related transactions by March 12.

It is estimated that Russia controlled at least 600 tankers in its shadow fleet in 2023, and according to reports, the latest sanctions have affected about 10% of the global oil tanker fleet.

Last year, 36% of India's oil imports and nearly 20% of China's oil imports came from Russian crude.
The January 10 sanctions package from the U.S. also targeted dozens of traders, insurance companies, and major Russian companies such as Gazprom Neft and Surgutneftegaz.
According to Reuters, the Kremlin has promised to minimize the impact of the U.S. sanctions.

Different Winners of Russia's Oil Sanctions

The oil market, quickly adapting to the new U.S. sanctions on Russia's shadow fleet of oil tankers, creates both short-term and medium-term winners and losers.

In the short term, the winners are Middle Eastern oil exporters, as demand for their oil increases from refineries in India and China, which are seeking alternatives to Russian cargoes.

Tanker owners also benefit from higher rates for ships that are not subject to the sanctions imposed by the U.S. and other Western countries on Russian crude oil exports.

On the other side of the equation, Indian and Chinese refineries are the losers, as their costs rise because they are forced to purchase more expensive alternatives instead of Russian crude. The cash price of Dubai oil, which is the benchmark for Middle Eastern oil, closed at $81.25 per barrel on Tuesday, which is $3.63 higher than Brent oil.

Dubai oil is typically traded at a discount to Brent, but since the U.S. government, under President Joe Biden,

imposed new stringent measures against Russia, including sanctions on tankers transporting Russian oil in the shadow fleet, its price has risen by over $3 per barrel.

Reports suggest that Indian refineries are facing difficulties securing Russian cargoes for delivery in March. Anuj Jain, Chief Financial Officer of Indian Oil Corporation, said on Tuesday that the company expects lower imports from Russia.

According to data from LSEG's oil research division, India, the largest buyer of Russian crude, sourced 1.71 million barrels per day, or 40% of its total imports, from Russia in 2024. China, the second-largest importer of Russian crude, imported 1.09 million barrels per day by sea and up to one million barrels per day via pipeline last year.

India mostly imports Russia's Urals grade, which is exported from its European ports, while China mainly buys the ESPO grade, which is shipped from Russia's Eastern ports.

Tankers loading at Russian ports in Europe must pass through waters controlled by sanctioning countries, so India is likely to face more challenges continuing trade with Russia. The shorter shipping route from Russia's Far East to China makes it easier for China to continue purchasing ESPO oil, but tanker availability will be a major short-term issue.

The short-term impact of the new sanctions on Russian oil exports has been clear, driving up the price of Middle Eastern oil relative to other grades, increasing tanker freight rates, and restricting access to tankers.

Long-Term Risks of Oil Imports

The long-term consequences of the recent U.S. sanctions on Russian oil trade are not yet clear. First, there is the possibility that Russian oil sellers will find new ways to bypass the sanctions and maintain their crude oil flow, even if they have to lower prices and reduce profit margins.

However, the biggest impact of the sanctions may be that China and India reduce their oil imports in the coming months.

China, the world's largest oil importer, has a history of reducing imports when prices rise. Chinese refineries can do this given their ample reserves and weak fuel consumption amid modest economic growth.

Private Chinese refineries may also suspend operations if their access to cheaper Russian crude is limited. Many of these refineries are facing higher costs for alternatives like fuel oil after Beijing reduced the tax discount on imported feedstock.

This situation is more complex for Indian refineries, given their smaller reserves. If they are unable to secure enough competitively priced crude oil, they may be tempted to cut refining rates.

Refinery margins from the recent rise in oil prices are under pressure, and with the demand for fuels like gasoline and diesel in many Asian countries, the increase in oil prices has not yet been fully reflected in the prices of these products.

According to a Reuters report, the refining margin for processing each barrel of Dubai oil at a typical Singapore refinery reached $1.53 per barrel on Tuesday, significantly lower than the 365-day average of $4.46.

AKAM
BITUMEN COMPANY

شرکت قیر آکام
(سهامی خاص)
AKAM BITUMEN

RIYONIZ
BITUMEN REFINERY

RBR
Riyoniz Bitumen Refinery
شرکت تولیدی و صنعتی ریونیز پالایش آبتان

Akam Bitumen Refinery has been established in the year 2009 based on International Oil and Gas Standards which could achieve "Quality Management System ISO2001:20015" , "Environment Management System ISO1401:2015" , " Health & Safety Management System OHSAS 1801:2007 " and "European Standard CE" successfully. Worth to mention that Akam Bitumen Refinery is distinguished to have the production capacity of more than 2500 MT/DAY of all Grades of Bitumen in various Packings in order to respond to our valued customer's requirement.

Riyoniz Bitumen Refinery which was established in the year 2012 is privileged to be located in an industrial area near Bandar Abbas port which has the production capacity of more than 2500 MT/DAY of all Grades of Bitumen in various Packings.
Relying on our Refineries and our capabilities we are honored to be one of the leading companies in the industry in this region , trying our best level to provide our valued customers with the best Quality and Services to meet their satisfaction.

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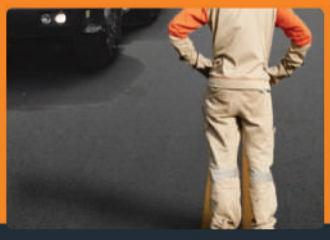

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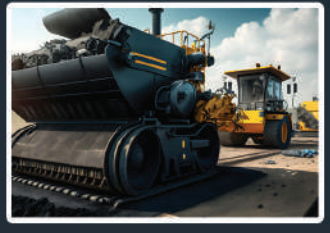


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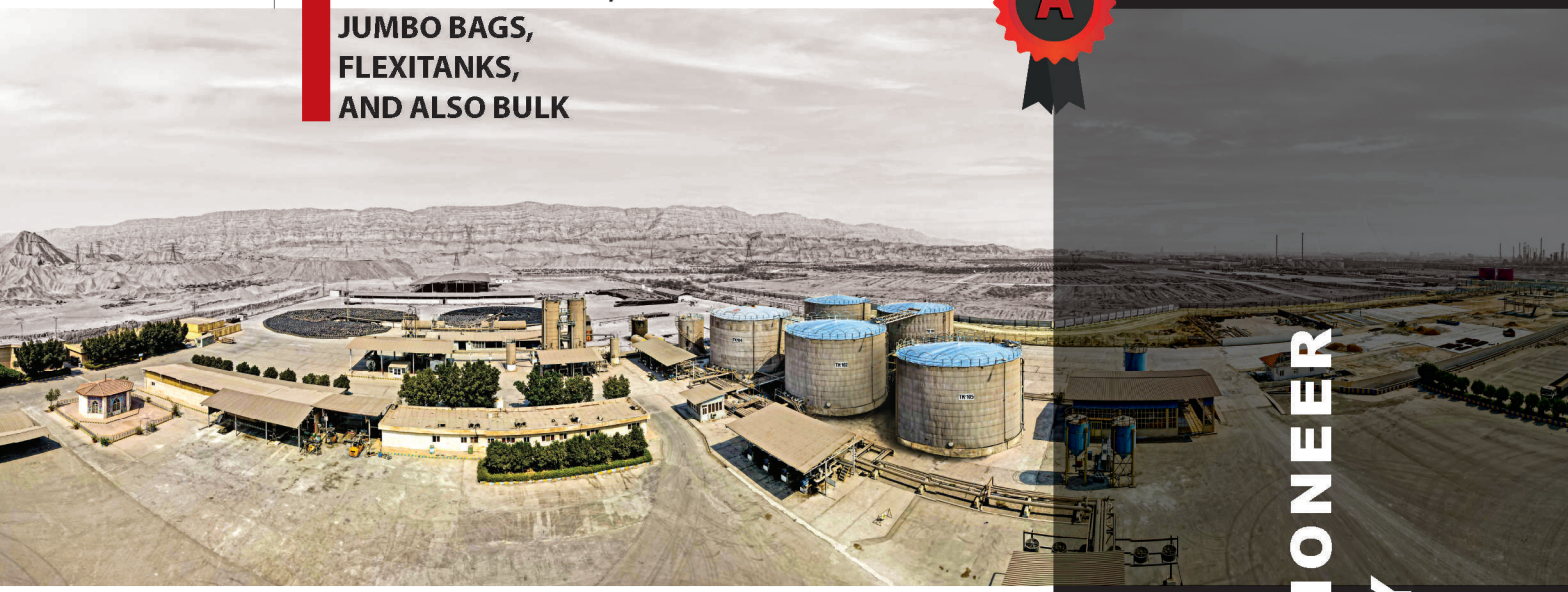

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