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# WPB Global Bitumen Price

## Week 3 of May 2026

Bitumen markets across the Asian region, including Singapore, China, India, South Korea, Malaysia, Vietnam, Thailand, Indonesia, Bangladesh, and Sri Lanka, are currently experiencing significant price instability. The ongoing geopolitical uncertainty surrounding the Strait of Hormuz has disrupted maritime transit security and supply chain predictability, leading to irregular price fluctuations and the erosion of established market benchmarks across these nations.

In the Middle East, the pricing environment exhibits acute volatility. Iran and Iraq are facing pronounced market turbulence, where regional tensions and logistical constraints tied to the Strait of Hormuz have fundamentally distorted traditional pricing structures. Meanwhile, countries like the United Arab Emirates and Turkey are also witnessing a shift

toward inconsistent valuations, as their proximity to regional maritime hubs amplifies exposure to erratic market adjustments.

European markets, including Germany, Spain, and Italy, are similarly navigating a landscape characterized by weakened price equilibrium. The strategic instability at the Strait of Hormuz has introduced complex logistics challenges and external cost pressures into European energy supply chains. Consequently, bitumen prices in these regions have moved away from historical stability, showing reactive patterns and an increased susceptibility to global geopolitical developments.

Markets in Australia, South Africa, Brazil, and Venezuela, despite their geographic distance from the primary area of conflict are not immune to the prevailing global insta-

bility. The indirect repercussions of shipping uncertainties in the Strait of Hormuz have disrupted international freight calculations and import cost projections. As a result, these nations are observing intermittent price corrections and a persistent inability to maintain consistent, long-term pricing trajectories.

In summary, the global bitumen sector is currently defined by a widespread lack of price stability. The interconnected nature of international energy logistics means that the geopolitical sensitivity of the Strait of Hormuz acts as a catalyst for volatility across all major consuming and producing countries. Stakeholders across all 21 markets remain focused on short-term navigation, as the current environment continues to preclude the restoration of predictable and sustained pricing patterns.

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### Iran

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (Drum)	471 ± 10	FOB Bandar Abbas
	60/70 (Bulk)	401 ± 10	FOB Bandar Abbas
	60/70 (Jumbo Bag)	451 ± 10	FOB Bandar Abbas
	60/70 (Drum)	440 ± 10	Ex-work Bandar Abbas
	60/70 (Bulk)	363 ± 10	Ex-work Bandar Abbas
	60/70 (Jumbo Bag)	399 ± 10	Ex-work Bandar Abbas

The Iranian bitumen market is currently characterized by pronounced price instability. Ongoing geopolitical tensions surrounding the Strait of Hormuz have disrupted traditional supply and export dynamics. As a result, pricing mechanisms have become highly reactive to short-term developments. Market forecasts remain uncertain due to continued regional volatility.

## Singapore

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	491 ± 10	CIF Singapore
	60/70 (bulk)	411 ± 10	FOB Singapore

Bitumen prices in Singapore are experiencing irregular fluctuations amid heightened global maritime uncertainty. Developments in the Strait of Hormuz have weakened price predictability across energy-linked commodities. The market lacks a stable reference level, with frequent short-term adjustments observed. Participants remain cautious in forward contracting.

## China

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	471 ± 10	CFR Chongqing
	60/70 (drum)	463 ± 10	CFR Hong Kong
	60/70 (drum)	451 ± 10	CFR Ningbo
	60/70 (drum)	465 ± 10	CFR Huangpu
	60/70 (drum)	464 ± 10	CFR Yunfu
	60/70 (drum)	461 ± 10	CFR Tianjin
	60/70 (drum)	459 ± 10	CFR Dalian
	60/70 (drum)	463 ± 10	CFR Guangzhou
	60/70 (drum)	458 ± 10	CFR Nansha
	60/70 (drum)	450 ± 10	CFR Zhuhai

The Chinese bitumen sector is facing inconsistent pricing behavior influenced by external geopolitical variables. Instability near the Strait of Hormuz has altered international supply expectations and freight calculations. This environment has prevented the formation of sustained price equilibrium. Current trends reflect elevated market sensitivity.

## UAE

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	405 ± 10	FOB Jebel Ali
	60/70 (drum)	453 ± 10	CFR Jebel Ali

In the UAE, bitumen pricing structures are operating under significant uncertainty. Given the country's geographic proximity to the Strait of Hormuz, market volatility has intensified. Fluctuations are occurring at irregular intervals, limiting pricing transparency. Strategic risk assessment remains central to procurement decisions.

## Sri Lanka

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	476 ± 10	CFR Colombo

Sri Lanka's bitumen market is demonstrating heightened price variability. Import dependency combined with instability in the Strait of Hormuz has disrupted cost forecasting models. As a consequence, pricing consistency has deteriorated. Market evaluations indicate persistent short-term volatility.

## Iraq

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	455 ± 10	FOB Bandar Abbas
	60/70 (bulk)	405 ± 10	FOB Bandar Abbas

The Iraqi bitumen market is currently subject to substantial pricing turbulence. Regional geopolitical pressures and logistical constraints tied to the Strait of Hormuz have significantly distorted traditional supply flows. Price signals remain unstable and reactive. Long-term stabilization appears unlikely under current conditions.

## Turkey

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	494 ± 10	CFR Istanbul

Turkey's bitumen prices reflect a volatile adjustment cycle influenced by external maritime risks. The instability within the Strait of Hormuz has complicated international trade calculations. Price movements lack continuity and exhibit irregular oscillations. Market confidence remains constrained.

## Australia

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	550 ± 10	CIF Brisbane
	60/70 (bulk)	470 ± 10	CIF Brisbane

Although geographically distant, Australia's bitumen market is experiencing indirect instability. Global shipping uncertainty linked to the Strait of Hormuz has disrupted import cost structures. Price trajectories show inconsistency rather than sustained directional movement. Forecast reliability remains limited.

## South Korea

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	415 ± 10	CFR Busan
	60/70 (drum)	455 ± 10	CIF Busan

South Korea is witnessing fluctuating bitumen valuations amid broader geopolitical tension. Instability in the Strait of Hormuz has injected unpredictability into global supply chains. Domestic prices are responding unevenly to external developments. A stable pricing corridor has not yet been re-established.

## Malaysia

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	477 ± 10	CFR Penang
	60/70 (drum)	527 ± 10	CFR Kota Kinabalu
	60/70 (drum)	454 ± 10	CFR port Klang
	60/70 (drum)	461 ± 10	CFR Pasir Gudang

Malaysia's bitumen sector is currently navigating irregular price shifts. The uncertainty surrounding the Strait of Hormuz has introduced external cost pressures into regional trade flows. Market equilibrium remains fragile. Frequent recalibration of price quotations is being observed.

## India

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	488 ± 10	CFR Chennai
	60/70 (drum)	479 ± 10	CFR Cochin
	60/70 (drum)	508 ± 10	CFR Haldia
	60/70 (drum)	463 ± 10	CFR Mundra
	60/70 (drum)	458 ± 10	CFR Kandla
	60/70 (drum)	451 ± 10	CFR Nhava sheva
	60/70 (drum)	490 ± 10	CFR Tuticorin
	60/70 (drum)	500 ± 10	CFR Kolkata

The Indian bitumen market is operating in an environment of weakened price stability. Concerns over maritime transit security at the Strait of Hormuz have intensified procurement risk. Pricing movements are sporadic and lack structural consistency. Market participants remain exposed to external volatility.

## Vietnam

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	453 ± 10	CFR Haiphong
	60/70 (drum)	454 ± 10	CFR Ho chi Minh

Bitumen pricing in Vietnam has entered a phase of heightened unpredictability. The geopolitical environment affecting the Strait of Hormuz has constrained supply chain visibility. As a result, stable pricing benchmarks are difficult to establish. Market adjustments remain reactive.

## Brazil

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	625 ± 10	CIF Navegantes
	60/70 (drum)	601 ± 10	CIF Santos

Brazil's bitumen market is reflecting global pricing instability. While geographically distant, the repercussions of Strait of Hormuz tensions have influenced freight and supply cost structures. Price consistency has diminished, with intermittent corrections occurring across recent trading cycles.

## South Africa

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	560 ± 10	CIF Durban

In South Africa, bitumen prices demonstrate considerable fluctuation under prevailing global conditions. Instability in the Strait of Hormuz has contributed to uncertainty in maritime logistics. The absence of a sustained pricing pattern underscores current market fragility.

## Indonesia

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	483 ± 10	CFR Belawam
	60/70 (drum)	470 ± 10	CFR Jakarta
	60/70 (drum)	468 ± 10	CFR Surabaya

Indonesia's bitumen market is currently defined by irregular price dynamics. External geopolitical pressures related to the Strait of Hormuz have disrupted historical pricing stability. Movements are non-linear and lack predictable intervals. Market normalization has not yet materialized.

## Bangladesh

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	477 ± 10	CFR Chittagong

Bangladesh is experiencing notable instability in bitumen price formation. The uncertainty surrounding maritime security in the Strait of Hormuz has compromised import cost projections. Price volatility persists without clear stabilization indicators.

## Thailand

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	478 ± 10	CFR Bangkok
	60/70 (drum)	468 ± 10	CFR Laem Chabang

Thailand's bitumen sector reflects ongoing market disruption. Developments in the Strait of Hormuz have introduced significant uncertainty into international trade routes. Pricing structures are adjusting inconsistently, preventing the restoration of stable valuation benchmarks.

## Venezuela

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	500 – 540	FOB Jose Terminal
	60/70 (bulk)	420 – 460	FOB Jose Terminal
	60/70 (drum)	490 – 530	FOB Puerto La Cruz
	60/70 (bulk)	410 – 450	FOB Puerto La Cruz
	60/70 (drum)	480 – 520	FOB Amuay
	60/70 (bulk)	400 – 440	FOB Amuay

The Venezuelan bitumen market is currently subject to unstable pricing conditions. Global geopolitical disturbances centered on the Strait of Hormuz have intensified existing structural sensitivities. Price levels exhibit erratic behavior, limiting forecast accuracy.

## Germany

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	571±10	CFR Hamburg
	60/70 (bulk)	545±10	CFR Hamburg

Germany's bitumen pricing framework is encountering irregular shifts. Strategic uncertainty in the Strait of Hormuz has reverberated through global energy supply chains. As a consequence, price stability has weakened and short-term fluctuations have increased.

## Italy

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	545±10	CFR Genoa
	60/70 (bulk)	505±10	CFR Genoa
	60/70 (drum)	550±10	CFR La Spezia
	60/70 (bulk)	500±10	CFR La Spezia

Italy is experiencing a period of pricing inconsistency within its bitumen sector. Developments near the Strait of Hormuz continue to distort maritime logistics and trade flows. Market quotations remain unstable, with no definitive return to equilibrium observed.

## Spain

Date	Bitumen Grade	Price (USD/MT)	Price Basis
Week 3 of May 2026	60/70 (drum)	550±10	CFR Barcelona
	60/70 (bulk)	535±10	CFR Barcelona
	60/70 (drum)	545±10	CFR Valencia
	60/70 (bulk)	530±10	CFR Valencia

Spain's bitumen market is demonstrating a disrupted pricing pattern. Geopolitical instability affecting the Strait of Hormuz has undermined confidence in long-term cost projections. Current pricing movements lack consistency and reflect heightened external sensitivity.





# BIO-BITUMEN - THE SUSTAINABLE BINDER

**He is a bitumen expert with over 25 years of experience in the field and former General Manager at HPCL(Hindustan Petroleum Corporation Limited)**

**- A S Prabhakar**



Bio-bitumen is the new kid on the block and has been generating a lot of interest in the last few years. The natural questions that come to our mind are: what is bio-bitumen, how is it different from other forms of bitumen, what are its advantages, and what are the new challenges in manufacturing and using it in road construction? We will try to answer these questions not in Q&A format, but in long-form narrative.

Some indications suggest that conventional bitumen has an emission factor of around +250 Kg CO<sub>2</sub> eq/t, whereas a bio-bitumen can have a factor of -250 Kg CO<sub>2</sub> eq/t. Which means that the production process of some bio-bitumen absorbs CO<sub>2</sub> instead of releasing CO<sub>2</sub> resulting in a total emission reduction of about 500 Kg CO<sub>2</sub> eq/t. Such emission factor assessment or a total environmental impact assessment should be the benchmark for assessing a bio-bitumen.

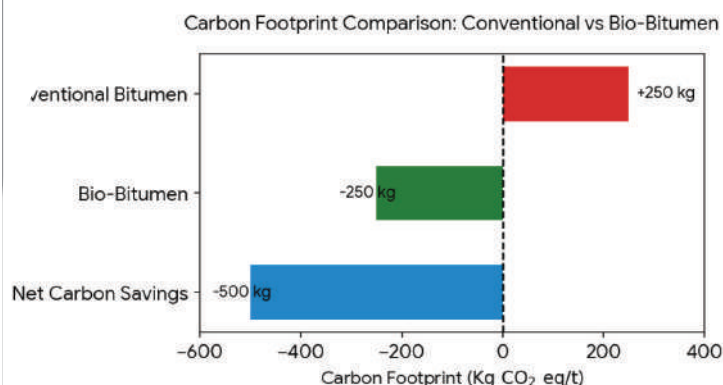
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The first road to be paved with petroleum bitumen was Pennsylvania Avenue in Washington DC in 1876 and we have travelled a long distance since then. Today the total bitumen consumption is estimated to be in the range of 120-130 million metric tons, and it is likely to increase to about 150 million metric tons by 2029. At the same time, the annual global emissions attributable to fossil fuels (including petroleum and coal) now exceeds 38 billion metric tons (GtCO<sub>2</sub>). This humongous number has pushed us to look for sustainable low-carbon alternatives and bio-bitumen is the most promising of such alternatives. It is a sustainable petroleum-free-binder obtained from renewable resources like agricultural waste, lignin, vegetable oils or any other organic product.

Significant work has been done in the field of bio-bitumen by India in the last few years. Countries like France, Netherlands, UK, USA, Australia and New Zealand have also been working in this field.

Bio-bitumen production development is still in early stages. Multiple methods of manufacturing are being attempted. While some are beyond the trials stage, some are in advanced stage of trials, and some are at the drawing board or conceptual stage.

**The manufacturing of bio-bitumen can be done using the following materials:**



## 1. Rice stubble, straw, wood waste and similar materials

Pyrolysis of agricultural waste like rice stubble or straw, wood waste, and similar materials at 300-700°C generates a dark sticky liquid (bio-oil) or a solid (bio-char), depending on the process conditions. The bio-oil can be blended with harder grades of bitumen like natural bitumen or propane de-asphalted bitumen to get a binder that meets the paving bitumen specifications.

Blending bio-oil with bitumen manufactured from other processes can also be attempted but the dosages are likely to be lower. As far as bio-char is concerned, it can be blended with softer grades of bitumen or with vacuum tower bottoms to get binders meeting specifications of paving bitumen.

**2.Lignin**

Lignin is a complex polymer that acts as a natural binding agent found in the plants. It is a waste product generated in the pulp and paper industry or in the second-generation ethanol plants. This can be blended with softer grade bitumen or with vacuum tower bottom to get bitumen meeting specifications of paving grade.

**3.Used Engine Oil**

Re-refining of used engine oil can also yield some bitumen, but this material would not be a bio-bitumen within the strictest terms of the definition as the source material is not a biomass.

**4.Epoxidation or Transesterification of Used Cooking Oil**

Used cooking oil is filtered to remove water and other impurities. It is then converted to fatty acid methyl esters (FAME) which can be used as rejuvenators or modifiers in bituminous

binders. These esters can also be further polymerized using catalysts like Potassium Hydroxide or Methanol to create a material that is closer to a binder that is somewhat like bitumen. This material can be combined with polymers to create a binder that meets the paving bitumen specifications. It can also be blended with hard or soft grade bitumen (depending on the material specifications) to create a binder meeting the specifications of paving bitumen.

**5.Treatment of Plant Resins**

Vegetable resins, pine resin or cottonseed resin can be extracted from these materials using solvents like acetone or ethanol. This can be further purified and thermally oxidized at 210-220°C in the presence of catalysts like Ferric Oxide and Phosphoric Acid to generate a material very similar to bitumen. This material would largely be meeting the specifications of softer grades of bitumen and can be used for low-traffic-volume roads. For high-traffic-volume roads this would have to be blended with harder grades of bitumen or with some other additives to get the right specifications.

**6.Hydrothermal liquefaction of microalgae like Spirulina**

Microalgae like Spirulina are cultivated

in a controlled environment, capturing atmospheric carbon dioxide through photosynthesis. After the high-value components (like proteins and lipids) are extracted, the remaining residue is heated under high pressure where the hydrothermal carbonization and then liquefaction takes place. This yields a bio-crude from which water, solid residues, and bio-chars are filtered out to yield a visco-elastic binder. Depending on the species of microalgae and residence time in the reactor, the biocrude can be further processed to meet the bitumen specifications.

While each method has its advantages and disadvantages, it is necessary to evaluate the bio-bitumen manufactured from these methods on the primary aspects of sustainability, scalability, and ability to replicate or mimic the bitumen properties to the closest (on a standalone basis or when blended with petroleum bitumen or natural bitumen).

If they cannot replicate or mimic the bitumen properties, they should at least enhance its properties or retain them while providing additional environmental benefits.

The actual performance of a bio-bitumen will have to be measured on the above parameters.

**Some of the advantages and disadvantages of bio-bitumen from the above processes are as follows:**

Production Method	Key Advantages	Key Limitations	Scalability Outlook
<b>Pyrolysis of Agri-waste</b>	Utilizes abundant waste; bio-oil blends well with hard bitumen; potential negative CO <sub>2</sub> footprint	Bio-oil variability; odour issues; requires blending for performance	High, due to large biomass availability
<b>Lignin-based Binder</b>	Renewable industrial by-product; improves stiffness; good for partial replacement	Brittle at high dosages; limited standalone binder performance	Medium–High (large lignin streams globally)
<b>Used Engine Oil Re-refining</b>	Waste management benefit; improves workability	Not biomass → not true bio-bitumen; contamination risks	Medium (but limited sustainability value)

Production Method	Key Advantages	Key Limitations	Scalability Outlook
<b>Used Cooking Oil (Epoxidation/Transesterification)</b>	Circular economy; good rejuvenator; improves low-temperature performance	Needs catalysts; may require polymer modification; limited high-traffic performance alone	Medium (urban waste oil streams growing)
<b>Plant Resin Treatment</b>	Naturally sticky; close to soft bitumen properties; biodegradable	Mostly suitable for low-traffic roads; needs blending for strength	Low–Medium (resin availability limited)
<b>Microalgae Hydrothermal Liquefaction</b>	Carbon-negative; highly tunable chemistry; futuristic scalability	High production cost; requires controlled cultivation; early-stage tech	Medium–High long-term (once biorefineries scale)

While the production technology is evolving and being perfected it is necessary that we develop a proper measurement matrix to understand the relative environmental impact of the bio-bitumen made from all the processes. Europe already has a standard (EN15804+A2) for assessing the environmental impact of construction materials from ‘cradle to end-of-life’. A standard Life

Cycle Cost Assessment yields a multitude of complex and disparate results, making it difficult to assess the actual relative environmental impact. To resolve this issue the Environmental Cost Indicator (ECI) has been developed by The Netherlands where the total environmental footprint of a product, material, or project is quantified into a unified monetary value expressed in Euros.

**Irrespective of the process, it is necessary that the bio-bitumen meets the following criteria:**

- I. **Deliver consistent quality**
- II. **Meet the bitumen specifications as per the Penetration standards and/or, Viscosity standards and/or Performance standards**
- III. **Be suitable for manufacturing bitumen emulsions? modified bitumen? and warm asphalt mixes**
- IV. **Meet the desired mix design performance standards with a wide range of aggregates**
- V. **Ability to perform with high percentage of RAP**
- VI. **Pavements constructed with these binders should be 766% recyclable**
- VII. **Pavements lifespan should be equal to or more than that of conventional bitumen pavements**
- VIII. **Pavement quality should be equal to or superior to that of conventional bitumen pavements**
- IX. **No negative impact on the food chain or adverse effects on survival of any living being**
- X. **Easy scaling up to large volumes**
- XI. **Not contain any leachable compounds which affect the water table in the long run**
- XII. **Net positive environmental impact from cradle to end of life**
- XIII. **Net positive impact considering the overall lifecycle cost**

Bio bitumen is no longer an experimental curiosity—it is rapidly becoming a credible, scalable, and environmentally essential alternative to petroleum based binders. As global infrastructure demands continue to rise, the transition toward sustainable materials is not optional; it is inevitable. The diverse production pathways for bio bitumen demonstrate that the technology is maturing, and several routes are already capable of delivering binders that meet or exceed conventional performance standards.

However, the true potential of bio bitumen will only be realized when the industry adopts a robust, transparent, and universally accepted evaluation framework. Standards such as EN15804+A2 and tools like the Environmental Cost

Indicator (ECI) offer a strong foundation, but a dedicated bio bitumen certification system built on the performance and sustainability parameters outlined in this document will be critical for large scale adoption.

If we succeed in establishing such a framework, bio bitumen can transform road construction into a sector that not only reduces carbon emissions but actively contributes to environmental regeneration. The opportunity is immense, and the responsibility is shared. Advancing bio bitumen is not just a technological pursuit—it is a commitment to the long term health of our planet and future generations.

# 霍尔木兹海峡阴影下的沥青市场： 价格回落，风险仍在

Ahmad Reza Yousefi – Razieh Gilani  
Infinity Galaxy



## 引言

自2026年2月28日以来，全球沥青市场进入了近几年最不寻常的阶段之一。这不能被简单理解为一次短期价格冲击，也不能被解释为市场正在回到正常状态。核心问题仍然是霍尔木兹海峡。自战争开始以来，这条通道一直处于关闭或严重受限状态，真正稳定、具有商业可操作性的重新开放时间仍不明确。

在这种环境下，沥青市场已经不能只通过布伦特原油、高硫燃料油（HSFO）或区域价格表来分析。买家的真正问题不再只是价格上涨或下跌了几美元，而是更现实的问题：货物是否真的可以运输？船舶是否会启航？战争险是否仍可承保？供应商是否能够在不突然改变海运费、交货时间或付款条件的情况下完成交易？

这正是当前市场与正常市场之间的关键差异。在正常市场中，价格是决策的起点。而在当前市场中，交易的可行性已经成为实际价格的一部分。

约5%–11%。但更重要的不是价格本身的变化。市场面对的并不仅仅是即时的产品短缺，而是合同执行风险。随后几周，这种风险进一步加深。当霍尔木兹海峡的通行不可预测时，卖方无法对货物离港时间作出充分承诺。船东也不愿接受常规风险。保险方要么提高保费，要么限制覆盖范围。因此，即使纸面上存在可供销售的产品，核心问题仍然存在：这批货物能否按时抵达，并且成本是否可以相对合理地预测？

这正是沥青市场从价格驱动型市场转变为执行驱动型市场的节点。

## 霍尔木兹海峡：不只是一个政治新闻标题

霍尔木兹海峡不仅是一条地理通道。它是全球最重要的能源运输咽喉之一。该地区大量原油和成品油通过这条路线运输。一旦这条路线受到干扰，影响不会停留在原油层面，还会传导至燃料油、海运费、保险、炼厂计划、沥青生产经济性以及客户采购决策。

过去几个月，市场曾数次对有限开放或个别船舶通行的消息作出反应。但这些反应不能被误读为市场已经恢复正常。几艘船通过，与一条稳定、安全、可计划的商业航线重新开放之间，有着本质差异。

今天的市场正被卡在这个中间地带。一方面，某些周的价格已经从高点回落。另一方面，执行信心并没有恢复。因此，价格下跌不应被误认为风险下降。

## 东亚：价格上涨，但需求后退

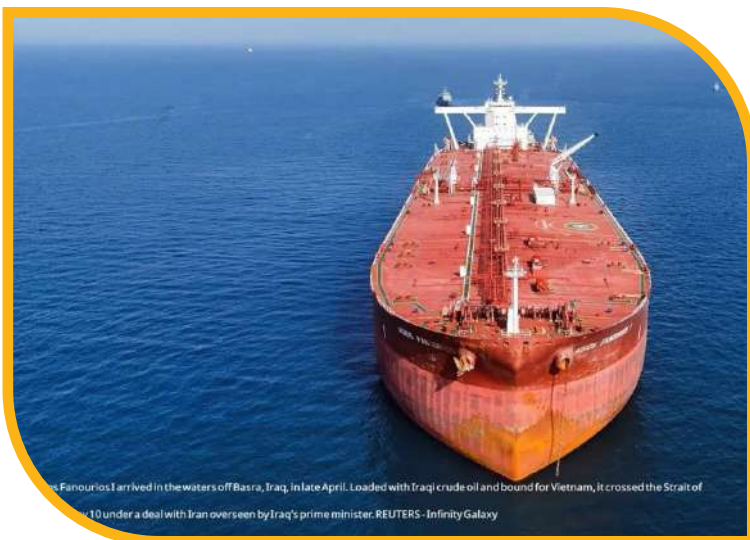
战争通过两条路径传导至东亚市场。第一是生产原料和高硫燃料油（HSFO）成本上升。第二是供应受限以及对生产稳定性的担忧。新加坡、韩国、泰国和中国的反应各不相同，但它们共同面对一个现实：市场已经不再以战前的信心作出决策。

在新加坡，战争开始后沥青价格明显上升。部分上涨来自整个能源市场的走强，但更重要的原因是市场担心生产原料供应、炼厂减产以及出口供应收紧。在若干周内，区域生产商面临产量下降或销售受限，使可供货量比名义价格本身更加重要。

## 从初始冲击到持续受压的市场

战争爆发后的第一周，能源市场立即作出反应。霍尔木兹海峡通行关闭或严重受限、战争险成本上升、海运费上涨、港口作业放缓，以及海上安全风险增加，同时冲击了原油、成品油和沥青市场。

根据Infinity Galaxy每周市场报告，危机初期布伦特原油进入84–85美元/桶区间，多个全球市场的沥青价格上涨



as Fanourios I arrived in the waters off Basra, Iraq, in late April. Loaded with Iraqi crude oil and bound for Vietnam, it crossed the Strait of Hormuz under a deal with Iran overseen by Iraq's prime minister. REUTERS - Infinity Galaxy



韩国也进入了类似状态。生产原料供应担忧、产量谨慎以及炼厂层面的决策，在某些阶段限制了出口供应。对于东亚买家来说，韩国通常是新加坡之外的重要替代来源。但当韩国自身也面临供应受限时，买家只能在三个困难选项之间选择：支付更高价格、消耗库存，或推迟采购。

中国的行为则有所不同。国内价格上涨，但需求并没有以相同强度跟随。原因很简单：中国买家通常不会仅仅因为市场恐慌就激进采购。如果价格处于高位，但项目、资金流动性、天气、施工季节性和供应信心没有同时配合，买家往往会避免大规模现货采购承诺。

在这一阶段，部分中国买家动用了罐区库存；部分买家只采购即时需求；也有一些买家选择观望，等待霍尔木兹海峡、原油、高硫燃料油（HSFO）、新加坡供应和韩国可供货量的下一步变化。这并不代表中国退出市场，而是体现了主动谨慎。

### 为什么中国没有让市场平静下来？

中国的角色很重要，但不应被过度放大。中国是主要消费国，是重要能源参与者，也是采购行为能够影响东亚市场的国家。但中国无法单独稳定一个核心问题来自霍尔木兹海峡、战争险、船舶流动和炼厂运营的市场。

最近几周，即使部分东亚船货价格有所走软，中国买家仍保持谨慎。这说明买家并没有接受市场已经重新具备运营可靠性的判断。如果市场真的恢复正常，价格回落本应更快激活需求。但当物流和供应仍然不确定时，大型买家更倾向于暂缓行动。

这一点对卖方和买方都很重要。中国需求偏弱可以限制价格进一步上涨，但不能消除供应风险。若霍尔木兹海峡再次受到更严格限制，或新加坡、韩国可供货量再度收紧，

中国可能迅速回到市场。届时，对船货的竞争可能在短时间内再次推高价格。

价格降低，并不一定意味着市场变好

在某些阶段，新加坡和韩国沥青价格从前期高点回落。表面看，这似乎意味着市场更加平静。但实际上，这只是整体图景的一部分。价格下跌可能是因为条件改善，也可能是因为需求疲弱、买家等待、项目延迟、预算承压，或市场无法判断下周的风险。

在当前东亚市场中，价格降低更像是买家谨慎的信号，而不是市场正常化的明确信号。高硫燃料油（HSFO）在若干周内释放了上涨信号，但沥青并不总是以相同力度跟随。这意味着市场被夹在两股力量之间：生产和生产原料成本仍处于高位，但需求不愿接受每一次更高报价。

这对供应商也并不容易。卖方面对更高成本、有限的生产灵活性和高风险海运运费；买方则在没有真实紧迫性的情况下抵制更高价格。结果是谈判市场变得更艰难，每一个报价都必须同时从价格、路线、时间、付款条件和执行能力来判断。

### 伊朗：价格仍具吸引力，但执行难度更高

对许多买家而言，伊朗价格仍可能具有吸引力。但自2月28日以来，围绕伊朗船货的主要问题已经不再只是价格。核心问题是货物如何离开该地区，以及需要承担多高的运营风险。

当霍尔木兹海峡关闭或严重受限，当船东保持谨慎，当战争险变得更昂贵或更难获得，当运输路线可能突然变化时，买家不能只依赖一个较低的数字。在这种环境下，没有清晰执行路径的低价报价，最终可能变得更昂贵。当前市场提醒买家：低价和可执行交易不是同一件事。在

正常时期，这种差异看起来可能只是技术问题。但在战争风险环境和霍尔木兹海峡受限的背景下，它可能决定整个合同的结果。

### 欧洲和非洲：压力不同，根源相同

在欧洲，沥青市场通过另一条路径承压。更高的原油和高硫燃料油（HSFO）成本、部分适合生产沥青的重质原油供应受限、炼厂检修以及施工季启动，使许多市场价格维持在高位。即使在原油价格回落的周内，供应紧张也阻止市场完全缓和。

在非洲，压力更多体现在进口和海运费上。若干东非和西非市场高度依赖进口货物。当海运费、保险和可供货量发生变化时，这些市场会很快在到岸价格中受到影响。在一些国家，项目需求仍然存在，但更高成本和更困难的供应，使采购决策更加复杂。

这意味着霍尔木兹海峡危机并非只影响伊朗或中东。它的影响已经出现在东亚、欧洲、非洲，甚至影响那些并不直接从伊朗采购、但仍暴露于原油、高硫燃料油（HSFO）、船舶、保险和海运费路线风险之下的买家。

### 当前市场：不是恐慌，也不是正常

对2026年2月28日至5月第三周的沥青市场，最准确的描述是：市场已经越过初始恐慌阶段，但并未正常化。

这个区别很重要，因为许多错误决策正是从这里开始。如果买家认为市场仍处于全面恐慌状态，可能会过快、过贵地采购。如果买家认为市场已经恢复正常，则可能低估海运费、保险和交货风险。这两种判断都是错误的。

当前市场仍处于压力之下。价格可能某一周走低，也可能在一条关于霍尔木兹海峡、战争险、船舶流动或东亚供应

的新消息之后再次改变方向。在这种市场中，正确的决策必须是分阶段、可复盘、并基于实时数据的。

### 买家现在应该怎么做？

在当前情况下，买家不应因为恐惧而决策。但也不应在市场很快恢复正常的假设下采购。如果项目并不紧急，调整采购时间或项目计划可以是理性的决策。当霍尔木兹海峡尚未恢复到稳定且具有商业可靠性的状态时，等待更清晰的市场条件并不是软弱，而是风险管理的一部分。

如果项目紧急，与可靠供应商合作比追逐纸面最低价更重要。供应商不应只是报一个数字，还必须能够清楚说明可供货量、运输路线、交货时间、海运费风险、付款条件和运营限制。在今天的市场中，危机执行经验本身就是供应商真实价值的一部分。

第三个选择是进行紧密、实时的市场监测。在霍尔木兹海峡、战争险、船舶流动、新加坡和韩国供应以及中国采购行为更加清晰之前，采购决策不应被固定和封闭。市场需要每日监测，并随着新数据出现及时调整。

结论很直接：沥青市场仍然不正常。价格可能已经从高点回落，但风险并没有同步回落。自2月28日以来，霍尔木兹海峡仍是能源和沥青市场的关键压力点，其稳定、可靠重新开放的时间仍不明确。在这样的市场中，最低价格本身并不是解决方案。可执行性，已经成为价格本身的一部分。

资料基础：Infinity Galaxy 2026年3月5日至5月14日每周沥青市场报告，并结合部分国际市场出版物及能源机构关于霍尔木兹海峡和石油运输流量的数据。





# Africa's Infrastructure Surge Draws Bitumen Trade into a New Commercial Orbit

According to WPB, Recent developments across emerging construction corridors are beginning to register beyond regional boundaries, with implications extending into Middle Eastern supply chains and global petroleum derivatives markets. Increased road-building activity in several African economies is not only lifting demand for bitumen but also influencing allocation decisions among refiners and exporters in the Persian Gulf. The shift is subtle but measurable, as cargo flows, storage strategies, and contract structures begin to reflect a redistribution of demand away from historically dominant Asian destinations.

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Over the past several months, infrastructure programs in countries such as Kenya, Tanzania, Nigeria, and Côte d'Ivoire have accelerated at a pace that exceeds earlier projections. Government-backed highway expansions, supported by multilateral financing and bilateral agreements, have created sustained procurement requirements for paving materials. Unlike earlier cycles, where demand from these regions appeared sporadic or politically driven, current activity is tied to longer-term national development frameworks, suggesting continuity rather than short-lived spikes.

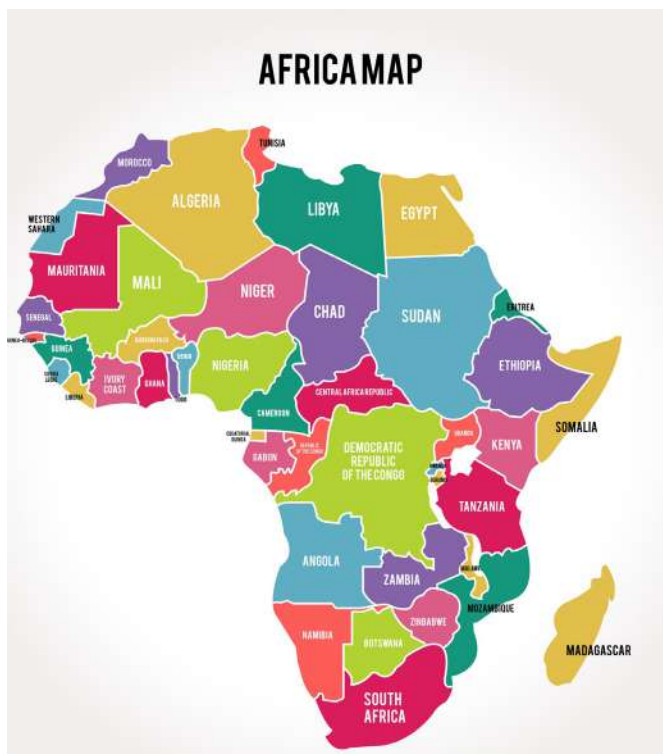
This emerging pattern is beginning to intersect with the operational realities of bitumen production. Refineries, particularly in the Middle East and parts of Asia, have

traditionally balanced output between transportation fuels and heavy residues such as bitumen. However, refining margins and evolving fuel specifications have already placed pressure on bitumen output in recent years. The additional pull from African infrastructure programs introduces a new layer of complexity. Exporters are now weighing not only price considerations but also logistical efficiency and contract stability when deciding allocation.

One of the notable characteristics of this development is the nature of procurement. In earlier market conditions, bitumen trade was often conducted through spot transactions or short-term contracts tied to price movements. The current trend indicates a gradual movement toward project-linked supply agreements.

Engineering and construction firms involved in large-scale road projects are increasingly securing material supply as part of integrated contracts, effectively bundling procurement with execution. This approach reduces exposure to price volatility and ensures continuity of supply, but it also reshapes how exporters engage with buyers.

For suppliers in the Middle East, this creates both opportunity and constraint. On one hand, proximity to East African markets offers logistical advantages, particularly through established shipping routes across the Red Sea





involve structured financing arrangements, sometimes backed by export credit agencies or development banks. This creates a more stable revenue stream for suppliers but may also involve stricter compliance and reporting requirements. The commercial landscape is becoming more institutionalized, moving away from purely transactional relationships.

From a strategic perspective, the ongoing developments suggest that bitumen is gradually becoming embedded within broader infrastructure ecosystems rather than functioning as a standalone commodity. Its demand is increasingly linked to policy decisions, financing mechanisms, and construction timelines. This integration enhances visibility for suppliers but also reduces flexibility, as volumes become committed well in advance.

Looking ahead, the continuation of this trend will depend

on several factors, including the pace of infrastructure execution in African markets, the stability of financing arrangements, and the ability of suppliers to adapt to evolving contractual frameworks. While uncertainties remain, particularly in relation to global economic conditions and energy market dynamics, the current trajectory indicates that Africa's role in the bitumen trade is likely to expand.

The shift is not abrupt, nor is it uniformly distributed across all markets. However, it represents a meaningful adjustment in how demand is structured and fulfilled. For industry participants, understanding these changes will be essential in navigating the next phase of market development. The intersection of infrastructure growth, logistical capability, and supply strategy is shaping a more interconnected and complex bitumen landscape.

## In a Strait Under Crisis: How Bitumen Cargoes Continue to Pass Through Hormuz

According to WPB, Recent maritime intelligence confirms that the naval interdiction of the Strait of Hormuz, a waterway through which approximately one-fifth of the world's petroleum liquids historically flowed, has not resulted in a complete commercial vacuum. While the blockade has successfully choked the majority of energy exports from the Persian Gulf, specific niche sectors, most notably the bitumen shipping trade have demonstrated a persistent, albeit fragile, capacity to exploit gaps in the cordon. This partial permeability is affecting regional economic calculations, as the survival of these low-volume, high-specificity cargoes prevents a total collapse of certain downstream construction markets across the Indian Ocean rim, yet the volume of traffic has declined so precipitously that it fails to offset the broader global supply shock.

Tracking data reviewed by maritime analysts reveals that under the shadow of US naval assets enforcing sanctions and interdiction orders, a handful of vessels have

successfully navigated the chokepoint. The most cited case in recent dispatches involves a tanker identified as the Argo Maris. The vessel departed from Bandar Abbas, the principal Iranian port for bitumen loading, carrying a full cargo of the construction material. Its declared destination was a port in Oman, a neighboring country that has not participated in the blockade. This specific movement is significant not for its volume, which is negligible compared to pre-conflict levels, but for its operational signal. It demonstrates that despite the presence of a naval blockade intended to pressure the Iranian economy, Iran retains a limited ability to export non-sanctioned or hard-to-trace petroleum derivatives.

Data aggregated by S&P Global Commodities at Sea indicates that in the initial days following the imposition of the blockade, daily traffic through the strait plummeted from the pre-conflict baseline of approximately 130 vessels. At the lowest point in early March, the count



# 稳定时代的终结： 为什么全球能源市场不再安全？



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根据 WPB, 全球能源市场近期进入了新的不稳定阶段。华盛顿方面同时出现的两项决定, 迅速改变了原油、海运、炼油以及工业商品市场的短期预期。第一项是有关特朗普暂时停止针对伊朗更大规模军事行动方案的消息。第二项则是美国决定延长俄罗斯石油30天豁免期, 使部分市场能够继续获得俄罗斯原油供应。这两项决定迅速影响了国际原油价格、海运费、炼油利润以及沥青市场。其重要性不仅体现在日常油价波动, 更在于这些决定出现时, 市场原本已经开始为波斯湾可能出现的大规模供应风险做准备。

能源市场最初的反应非常明显, 因为在相关消息出现之前, 市场普遍认为中东局势可能进一步升级, 并威胁霍尔木兹海峡的运输安全。在此前几个交易周期内, 投机资金明显增加了对原油市场的押注, 许多基金和大宗商品机构提高了针对供应中断风险的仓位。布伦特原油已经进入高价区间, 与波斯湾有关的油轮保险费用也快速上涨。因此, 市场并不仅仅是在回应新闻, 而是在重新计算真实供应风险。

特朗普暂停扩大军事行动后, 油价从高位有所回落, 因为市场认为波斯湾出口立即中断的可能性暂时下降。但油价并未出现大幅下跌, 这意味着市场仍然认为地缘政治风险没有真正消失。这一点非常关键。过去中东局势缓和时, 原油市场往往会出现大规模抛售, 但这一次市场反应明显不同, 因为越来越多交易商认为, 未来任何新的供应中断都可能在极短时间内突然发生。

当前局势之所以更加重要, 是因为如今的能源市场结构与过去中东危机时期已经明显不同。在2022年以前, 许多消费国仍然拥有更高的战略库存以及更灵活的炼油能力。但近年来, 全球经历了减产、炼油厂关闭以及物流问题之后, 许多地区的库存水平已经下降。这意味着, 即使波斯湾运输仅仅短暂受阻, 也可能更快推动柴油、燃料油以及沥青价格上涨。

与此同时, 美国延长俄罗斯石油豁免期, 也进一步增加了市场复杂性。这实际上说明, 目前全球市场已经缺乏足够能力去承受新的大型供应收缩。这与过去制裁时期形成明显区别。此前, 美国政策制定者通常更强调替代原油来源的充足性, 而如今, 维持市场稳定已经成为更优先的目标。

这一决定具有重要现实意义。俄罗斯原油仍然是亚洲、部分欧洲以及多个贸易中心的重要炼油原料来源。如果豁免没有延长, 一些进口渠道将在敏感时期面临严重不确定性, 而当时中东原油出口本身已经处于高度关注之中。通过延长豁免, 美国实际上降低了俄罗斯原油与波斯湾原油同时出现供应压力的风险。

这两项事件共同创造了新的市场环境。市场并未进入单边上涨模式, 而是进入了一种政治风险持续存在、但实际供应仍在继续流动的状态。这种环境通常意味着价格将出现更剧烈的日内波动, 而不是持续单方向上涨。如今, 政治消息对于市场的影响已经超过传统库存数据。

# The Slow Death of Bitumen! Why Are Refinery Bottoms Disappearing?

According to WPB, Refinery investment strategies across Asia, the Middle East and parts of Europe are increasingly raising concerns inside the bitumen and heavy petroleum materials sector because multiple indicators now suggest that future refining capacity may become less oriented toward paving-grade production and more focused on petrochemical integration, fuel upgrading and high-value conversion systems. Analysts monitoring refinery economics say the issue is no longer theoretical. A growing number of refining projects launched during recent years indicate that vacuum residue, traditionally used for asphalt and heavy products, is being redirected toward conversion units capable of generating higher-margin fuels and petrochemical feedstocks.

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The implications are particularly important for infrastructure markets in the Middle East, Africa and South Asia because these regions remain heavily dependent on long-distance asphalt supply chains connected to Gulf and Asian refining hubs. If residue availability for paving materials gradually tightens over the coming decade, several importing countries could face higher infrastructure costs, increased exposure to freight volatility and greater competition for export cargoes.

The concern is emerging from a combination of industrial data, refinery investment patterns and long-term energy transition policies rather than from a single announcement. Reports published by organizations including the International Energy Agency, S&P Global Commodity Insights, Wood Mackenzie and several downstream consulting groups increasingly show that refining companies are prioritizing “barrel optimization” strategies designed to maximize the economic value extracted from every barrel of crude oil processed. Under this strategy, lower-value residual materials are becoming targets for upgrading rather than direct sale into traditional heavy-product markets.

Historically, asphalt production depended heavily on vacuum residue left behind after lighter petroleum fractions such as gasoline, diesel, kerosene and naphtha were removed during refining. For decades, many refineries simply sold part of this residual stream into paving markets because the economics were acceptable and infrastructure demand remained stable. However, refining economics have gradually shifted. Modern refining systems now place far greater emphasis on conversion technologies capable of transforming heavy residual material into lighter, more profitable outputs.

Several trends are driving this development simultaneously. One of the most significant is the global expansion of petrochemical integration inside refinery design. New refining complexes built in China, India, the Middle East and parts of Southeast Asia increasingly combine traditional refining with petrochemical production units designed to maximize chemical feedstock output rather than residual fuel or asphalt production. Industry analysts note that petrochemical margins frequently exceed the profitability available from paving-grade materials, especially during periods of weak construction demand or unstable freight conditions.

Chinese refining strategy provides one of the clearest examples. Over recent years, China has invested heavily in integrated refining and petrochemical complexes capable of converting substantial portions of heavy residue into higher-value products. Independent industry assessments indicate that several newly developed Chinese facilities were designed with advanced residue upgrading capacity specifically intended to minimize lower-value residual output streams. This approach aligns with broader Chinese industrial policy favoring higher-value chemical production and export competitiveness.

A similar pattern is becoming visible in parts of the Middle

East. Refining expansion projects in Saudi Arabia, the United Arab Emirates and Kuwait increasingly emphasize petrochemical integration, fuel flexibility and advanced conversion technologies. Energy con

sultants following Gulf investment programs say many new projects are designed to improve profitability under future low-carbon transition scenarios by increasing exposure to petrochemicals rather than relying heavily on traditional transportation fuels or residual materials. In practice, this means a larger share of heavy refinery output may eventually be routed toward hydrocrackers, cokers and conversion systems instead of asphalt production.

Industry data also show that upgrading technology is becoming more economically attractive as refiners seek additional value from heavy crude processing. Delayed cokers, residue hydrocrackers and solvent deasphalting systems allow refineries to break down heavy molecules into lighter fuels and chemical feedstocks with significantly higher commercial value. According to downstream market analyses, refiners increasingly prefer these pathways because profit margins for transportation fuels, marine fuels and petrochemical intermediates often remain stronger than margins associated with paving products.

The situation is also connected to wider energy transition policies. As governments promote electric vehicles, emissions reduction targets and lower-carbon transportation systems, refining companies are facing uncertainty regarding long-term fuel demand patterns. Many operators therefore appear reluctant to remain dependent on traditional product slates. Instead, they are diversifying toward petrochemicals, specialty products and advanced materials expected to maintain stronger demand growth over the coming decades. Multiple market studies suggest that petrochemicals may represent one of the few major oil-related sectors expected to continue significant long-term expansion even as transportation fuel consumption eventually slows in some economies.

This shift carries direct implications for asphalt availability because paving materials remain fundamentally linked to residual refinery streams. If a larger portion of heavy residue is upgraded into fuels or petrochemical feedstocks,

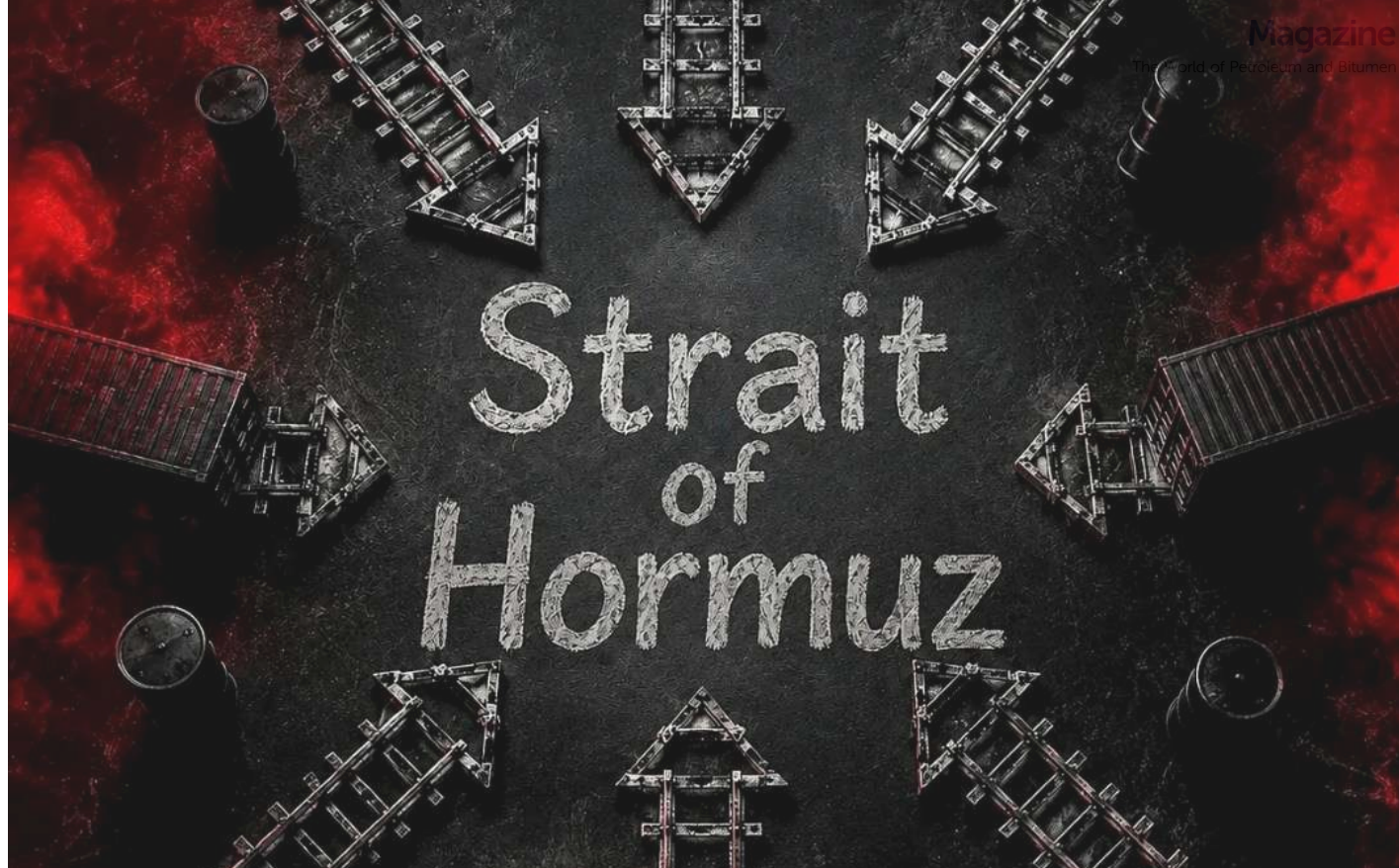
the volume available for paving applications may gradually tighten even if global crude oil production itself remains stable. Several analysts have warned that future supply risks for asphalt may emerge not because the world lacks crude oil, but because refiners increasingly find greater economic value in alternative uses for heavy residual fractions.

Europe presents an additional dimension to the issue. Several European refineries have either reduced operations, closed entirely or shifted focus toward renewable fuels and low-carbon processing systems in recent years. Environmental regulation, carbon pricing and weak refining margins have accelerated restructuring across parts of the European downstream sector. As regional refining capacity contracts or changes orientation, asphalt markets in Europe and nearby import regions may become increasingly dependent on external suppliers.

Freight and logistics conditions are further intensifying concern surrounding future asphalt supply stability. Shipping disruptions in the Red Sea, geopolitical tension around the Strait of Hormuz and rising tanker insurance costs have already demonstrated how vulnerable heavy petroleum product trade can become during security crises. Because asphalt often operates as a relatively low-margin cargo compared with premium fuels or petrochemical feedstocks, refiners and shipping companies may prioritize higher-value exports when transportation capacity becomes constrained.

Industry consultants monitoring heavy petroleum markets increasingly describe asphalt as a product facing structural competition inside the refinery itself. Rather than competing only against external market conditions, paving-grade material now competes internally with alternative refinery pathways promising stronger returns. This competition is particularly relevant for sophisticated modern refineries equipped with extensive conversion infrastructure capable of maximizing product flexibility.

Some analysts believe the consequences may become visible gradually rather than suddenly. Instead of an immediate global shortage, markets may first experience tighter seasonal availability, stronger freight sensitivity and wider regional price divergence. Infrastructure-importing countries with limited domestic refining capacity could become more vulnerable to supply interruptions during



Iranian officials warned that countries outside the Middle East could become targets if the United States launches broader military operations against Iran. The remarks were interpreted by energy traders and security analysts as an indication that Tehran may seek to widen deterrence messaging beyond regional borders. Although no formal military escalation was confirmed immediately after the statements, the political language itself was sufficient to generate fresh volatility across oil and shipping markets.

Energy traders reacted cautiously rather than dramatically during the first hours following the reports. Market participants appear increasingly aware that geopolitical events in the Gulf now produce layered consequences extending beyond short-term oil price movements. Analysts noted that while crude benchmarks initially strengthened, the deeper concern centered on logistics continuity rather than immediate supply destruction. Shipping reliability, insurance accessibility and refinery scheduling have become equally important variables for commodity markets dependent on uninterrupted maritime transport.

The Strait of Hormuz holds exceptional importance for bitumen and heavy petroleum product markets because several Gulf producers rely heavily on marine exports to supply Asian and African demand centers. Refineries in the United Arab Emirates, Bahrain, Kuwait and parts of Saudi Arabia continue exporting vacuum residue,

bunker feedstocks and paving-grade materials through Gulf shipping lanes connected directly to Hormuz transit routes. Any military uncertainty surrounding those corridors therefore creates immediate consequences for downstream infrastructure industries dependent on stable bitumen availability.

Shipping consultants reported that tanker operators recently began reviewing war-risk insurance exposure linked to Gulf voyages. Insurance pricing remains one of the fastest indicators of perceived geopolitical instability because underwriters adjust premiums rapidly whenever vessel safety becomes uncertain. Higher insurance costs are eventually transferred into freight rates, increasing delivered prices for crude oil, fuel oil, petrochemicals and bitumen cargoes. Import-dependent markets in East Africa, South Asia and Southeast Asia are particularly vulnerable because many rely heavily on Gulf-origin material for road construction and infrastructure projects.

Several commodity analysts noted that even without direct physical disruption to exports, persistent security incidents can still alter trade behavior significantly. Refiners and traders frequently respond to uncertainty by increasing storage activity, accelerating purchases or seeking alternative suppliers. Such behavior alone can tighten regional availability and create pricing distortions across petroleum product markets. Some Asian buyers reportedly began reassessing inventory coverage after recent security

developments raised fears of delayed shipments from Gulf loading terminals.

The implications extend beyond oil prices themselves. Logistics executives warned that shipping schedules across the Gulf are becoming increasingly difficult to predict as vessel operators incorporate additional security precautions into voyage planning. Transit coordination, crew safety procedures and route monitoring requirements have all intensified during recent months. Longer waiting times at ports or rerouted shipping movements may gradually reduce tanker availability for petroleum cargoes, placing additional upward pressure on freight costs.

Bitumen exporters face particular exposure because the market depends heavily on predictable delivery timing. Infrastructure contractors and government road agencies typically operate under strict construction schedules linked to seasonal paving windows. Delays involving cargo arrival can disrupt highway projects, airport resurfacing operations and industrial paving contracts across multiple regions simultaneously. Industry sources noted that several importers are now paying closer attention to Gulf security updates before finalizing new cargo tenders.

Refinery economics may also face growing strain if instability persists. Gulf refiners already operate within increasingly competitive export conditions shaped by weaker industrial demand in some regions, energy transition policies and fluctuating crude margins. Additional shipping and insurance expenses could narrow profitability for heavy petroleum products, particularly lower-margin materials such as paving-grade exports. Some traders believe refiners may eventually redirect more cargoes toward nearby markets if long-distance freight risk continues rising.

Political analysts meanwhile argued that the latest developments illustrate how energy security concerns are becoming inseparable from military calculations in the Gulf region. The combination of armed maritime incidents and broader strategic threats has reinforced perceptions that energy infrastructure, commercial shipping and regional diplomacy are now deeply interconnected. Financial institutions monitoring commodity exposure have reportedly increased attention toward shipping risk models tied to Middle Eastern supply routes.

The broader economic implications may become more visible if security conditions remain unstable for an extended period. Prolonged uncertainty in Hormuz would likely contribute to higher transportation expenses across global supply chains already facing pressure from elevated financing costs and slower industrial recovery in certain economies. Petrochemical manufacturers, asphalt producers, refiners and shipping companies could all encounter additional operational costs linked directly to maritime security management.

For bitumen markets specifically, the situation carries unusual sensitivity because supply concentration remains relatively high. Several countries across Africa and Asia depend heavily on Gulf-origin bitumen due to pricing advantages and established shipping connections. Sustained instability could encourage some importers to diversify sourcing strategies toward alternative suppliers including Russia, Southeast Asia or Mediterranean producers. However, replacement capacity remains limited in several regions, meaning Gulf exports continue holding critical importance for international infrastructure demand.

Shipping intelligence firms emphasized recently that market psychology itself has become a major variable. Even isolated incidents now generate rapid commercial reactions because traders remember previous disruptions involving the Strait of Hormuz, Red Sea attacks and earlier tanker confrontations. The combination of military rhetoric, shipping insecurity and energy dependency creates an environment where uncertainty alone can reshape commercial behavior long before any actual supply interruption occurs.

Analysts monitoring Gulf security trends believe the coming months may determine whether current tensions remain manageable or evolve into a broader maritime risk environment affecting multiple commodity sectors simultaneously. Much will depend on military signaling, diplomatic communication and the ability of regional authorities to maintain confidence in uninterrupted navigation through one of the world's most economically critical waterways.

# The Bacterial Revolution in Asphalt: The Swiss Technology Disrupting the Global Bitumen Market

According to WPB, Infrastructure laboratories in Europe are beginning to test a new category of self-repairing pavement materials that combines microbiology, encapsulation chemistry, and modified bitumen systems. The emerging concept, currently under examination in Switzerland, the Netherlands, and several university laboratories across Europe and Asia, focuses on embedding dormant bacteria inside microscopic capsules capable of surviving inside asphalt and bitumen-rich pavement structures. Researchers involved in these projects believe the technology could eventually reduce maintenance costs, extend pavement lifespan, lower bitumen consumption, and reshape the economics of long-distance transportation infrastructure in regions exposed to severe thermal stress.

The development has attracted attention because conventional asphalt systems continue to face structural limitations under increasing traffic loads, climate pressure, and rising maintenance costs. In the Middle East, where pavement temperatures regularly exceed performance thresholds during summer months, transportation ministries and road contractors are searching for new methods capable

of reducing rutting, fatigue cracking, oxidation, and thermal aging. The bacterial microcapsule concept is now being evaluated as one possible long-term answer to those conditions, especially for countries attempting to decrease repeated maintenance cycles on highways and industrial transport corridors connected to ports, refineries, and logistics zones.

The current generation of bacterial asphalt research differs significantly from earlier self-healing pavement concepts tested during the past decade. Previous approaches relied primarily on polymer modifiers, induction heating systems, steel fibers, rejuvenator capsules, or thermal activation techniques designed to soften aged bitumen and reconnect microcracks. Those technologies focused mainly on restoring binder flexibility after cracking had already begun. The newer biological systems are attempting something different. Instead of reheating or chemically softening the binder, researchers are investigating whether bacteria can generate mineral compounds directly inside developing cracks before major structural deterioration occurs.



# Hormuz

## Oil Tankers Hit the Brakes in the Strait of Hormuz; Energy Shipping and Insurance Costs Rise

### MAY



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According to WPB, Global shipping activity linked to the Persian Gulf entered a more unstable phase in mid-May 2026 after several international shipping companies postponed or reduced vessel movement through the Strait of Hormuz because of rising regional security concerns. At the same time, fuel supply complications affecting marine bunker markets intensified pressure across maritime logistics networks already strained by conflict-related disruptions. The immediate consequences have extended beyond oil cargo transportation. Energy trade flows, refinery scheduling, tanker insurance costs, bitumen exports, petrochemical logistics, and industrial procurement planning are all beginning to experience growing uncertainty connected to maritime risk exposure in the Gulf region. For the Middle East, the situation represents more than a temporary shipping disruption.

It reflects a broader operational environment in which geopolitical instability, shipping security, fuel availability, and industrial supply chains are becoming increasingly interconnected.

The latest shipping slowdown emerged after tanker operators

and maritime insurers reassessed navigation risks associated with the Strait of Hormuz following rising military tension involving Iran, regional security incidents, and expanding concern regarding commercial vessel vulnerability. Several shipping groups reportedly delayed return schedules or rerouted vessels while monitoring insurance conditions and naval security updates. Although the strait has not been formally closed, the growing reluctance among commercial carriers has already reduced traffic confidence within one of the world's most strategically important maritime corridors.

The Strait of Hormuz remains essential to global energy transport because a substantial percentage of internationally traded crude oil, condensate, LNG cargo, refined petroleum products, and petrochemical exports move through the corridor every day. Any reduction in vessel movement immediately influences freight pricing, tanker availability, insurance premiums, chartering schedules, and refinery feedstock planning across multiple continents. The current situation differs from earlier periods of geopolitical tension

because global shipping markets are simultaneously facing pressure from Red Sea instability, elevated war-risk insurance costs, and ongoing supply-chain disruptions inherited from previous energy and logistics crises.

One of the most immediate concerns involves marine fuel availability. Reports surrounding bunker fuel disruptions indicate that shipping operators are encountering increasing complications in securing stable fuel supplies for commercial vessels operating across Gulf-linked routes.

Bunker fuel markets are highly sensitive to refinery output stability, regional storage conditions, maritime congestion, and transportation scheduling. When shipping traffic becomes uncertain, fuel procurement patterns become unstable because suppliers, traders, and vessel operators begin adjusting inventory decisions according to perceived security risk.

The combination of tanker hesitation and bunker fuel instability creates operational complications extending far beyond shipping companies themselves. Refiners, commodity exporters, construction material

# DIGITAL REVOLUTION IN EUROPE'S ROAD INFRASTRUCTURE

According to WPB, Transport research centers and European engineering groups are increasingly integrating artificial intelligence and connected sensor systems into the management of asphalt infrastructure, at a time when governments face growing pressure to reduce industrial carbon emissions without slowing the expansion of road networks. The latest research projects published in France and by several European Union-affiliated institutions indicate that intelligent monitoring of asphalt is no longer merely an experimental concept associated with smart cities. It has now become part of Europe's long-term infrastructure policy, directly linked to environmental regulation, industrial efficiency, predictive maintenance, and energy management.

The significance of this trend is not limited to Europe. For Middle Eastern economies with a high dependence on bitumen exports and extensive development of transportation networks, the expansion of AI-enabled roads in Europe could gradually influence procurement standards, refinery operations, asphalt mix design, and even export conditions to carbon-sensitive markets.

This research has attracted attention because it connects three domains that previously operated largely in isolation: digital infrastructure analytics, environmental monitoring, and bitumen engineering. Earlier generations of smart road technologies primarily focused on traffic management, tolling systems, or structural inspection.

The new European approach, however, establishes an integrated operational framework in which AI models continuously process live data collected from IoT sensor networks embedded in roads, asphalt plants, maintenance fleets, and logistics systems. The objective of these systems is not merely to identify visible damage after it occurs, but to estimate future material degradation, determine optimal maintenance timing, calculate emissions associated with asphalt production, and identify which bitumen formulations produce lower environmental impacts under varying traffic and climatic conditions.

This distinction is the primary reason the industry is paying close attention to these new studies. The core innovation lies not in AI itself, but in the shift toward real-time environmental management of asphalt infrastructure. European regulators are increasingly linking transportation investments to climate reporting requirements. As a result, asphalt producers now face dual responsibilities: maintaining road performance while reducing greenhouse gas emissions across all stages of bitumen production, material heating, transportation, and road rehabilitation. AI systems have thus become operational tools capable of analyzing vast volumes of infrastructure data far more rapidly than traditional engineering methods.

In practice, IoT sensors installed within pavement layers or roadside equipment continuously collect data such as surface temperature, traffic load intensity, moisture conditions, structural stress, vibration patterns, and indicators of thermal cracking. These data are transmitted to cloud-based management platforms, where machine-learning models assess deterioration trends and maintenance priorities. Some European pilot projects have gone further by integrating satellite imagery, drones, weather forecasting systems, and refinery data into a single analytical platform. This enables responsible authorities to assess not only road conditions, but also the emissions associated with each stage of asphalt production and application.

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rely on performance prediction data for maintenance contracts, repair budgeting, and project financing. Such developments could reshape contractual structures within the road construction industry.

Despite this growth trajectory, significant challenges remain. Cybersecurity concerns are increasing as transportation systems become more digitalized, and data ownership among governments, contractors, and technology providers remains complex.

Moreover, AI predictions are only as accurate as the quality of the input data. Improper sensor installation or poor calibration can degrade system performance. Engineering concerns also persist regarding the long-term durability of sensors embedded within pavement structures. Asphalt infrastructure is continuously exposed to thermal expansion, vibration, moisture, and traffic loads. Maintaining stable sensor performance under such conditions is challenging. Consequently, researchers are working not only on software development, but also on resilient sensor materials and robust communication networks.

Nevertheless, the overall direction of the industry is increasingly clear. The road construction sector is entering a phase in which digital monitoring, environmental reporting, and asphalt engineering become interconnected components of infrastructure management. Europe's latest

research indicates that governments and engineering institutions are transforming roads into assets that generate operational data throughout their entire life cycle.

For the bitumen market, this trend may influence refinery strategies, product certification systems, export documentation, and asphalt design standards in the years ahead. Producers who adapt early to carbon reporting requirements and infrastructure data analytics are likely to secure stronger positions in future global markets. Conversely, organizations that continue to rely on traditional production models without environmental transparency may face increasing competitive pressure.

The importance of this research extends beyond academia. It reflects the emergence of a new framework for transportation infrastructure management—one in which asphalt performance, emissions control, maintenance scheduling, and digital analytics are jointly managed through integrated AI systems. Europe is currently leading much of this transition, but its commercial and regulatory implications are likely to extend to the global bitumen supply chain over the coming decade.



# Traders vs. Refiners: How Traders Are “Engineering” the Bitumen Market?



According to WPB, Recent military tensions and disruptions in global shipping routes have accelerated a major transition in the oil-product and bitumen business. Across the Middle East, Asia, Europe and Africa, independent commodity traders with no refinery ownership are gaining stronger control over physical supply chains. These companies do not produce bitumen themselves, yet they increasingly manage where cargoes move, how long products remain stored, which markets receive supply first and how prices are negotiated during unstable conditions. In the current geopolitical environment, influence in the bitumen market is shifting away from refinery ownership and toward logistics access, storage management, freight coordination and financial trading capability.

The importance of these firms became much clearer after repeated disruptions in the Red Sea shipping corridor, continuing sanctions on petroleum trade and rising insurance concerns linked to Gulf shipping routes. Tankers carrying fuel oil, vacuum residue and paving-grade bitumen faced longer sailing routes, higher freight costs and delayed discharge schedules. Traditional refinery exporters operating through fixed terminals encountered increasing pressure because their supply systems depended heavily on predictable shipping conditions. Independent traders adapted faster because they operated through flexible networks rather than single production facilities.

The concept of “bitumen without refinery” refers to companies that control trade without owning refining infrastructure. Instead of processing crude oil into petroleum products, these firms focus on purchasing cargoes, financing inventories, leasing storage tanks, blending specifications, arranging freight and reselling material across multiple regions. Their strength comes from market access rather than industrial ownership.

In recent months, this model has expanded rapidly because wartime conditions favor flexibility. Large refinery systems are expensive, fixed and vulnerable to disruptions ranging from sanctions and cyber risks to shipping delays and insurance restrictions. Independent trading companies operate differently. They rely on leased infrastructure across several countries, allowing them to reroute supply quickly whenever regional conditions change. Storage access has become one of the most valuable assets in this environment. Major energy hubs such as Fujairah, Singapore, Rotterdam and Turkish Mediterranean terminals are now functioning as redistribution centers for petroleum products and bitumen cargoes. Traders with access to storage tanks in these locations can hold inventories during freight disruptions, wait for more profitable pricing opportunities or redirect supply toward markets facing shortages.

In the bitumen business, storage capability is especially important because the product requires temperature-controlled handling and specialized logistics systems. Unlike lighter fuels, bitumen cannot move easily through ordinary petroleum infrastructure. Companies controlling heated storage terminals and dedicated loading facilities therefore gain substantial influence during unstable periods.

Blending operations have also become increasingly important. Different countries require different bitumen grades depending on climate conditions, road standards and engineering specifications. During refinery outages or export disruptions, independent traders use blending terminals to adjust product specifications and continue supplying infrastructure projects. This has allowed some firms to maintain deliveries even when refinery production became inconsistent. Another major advantage held by refinery-free trading companies is cargo diversification. Instead of depending on one refinery or one export route, these firms often source material from several suppliers across the Gulf region, Southeast Asia and parts of Europe. If one supply corridor becomes restricted, they can quickly shift toward alternative origins.

This flexibility became especially valuable after instability increased across key maritime routes. Longer shipping distances and higher war-risk premiums created delays for refinery-linked exporters operating on rigid schedules. Independent traders responded by increasing floating storage operations, using chartered vessels as temporary storage units until freight conditions improved or regional prices strengthened.

Financial trading has also strengthened the position of these companies. In recent periods of extreme market volatility, traders active in paper markets used futures contracts, hedging systems and arbitrage strategies to protect margins and reposition cargoes rapidly. Many refinery operators focused mainly on physical production reacted more slowly to sudden price swings. In the bitumen sector, this financial flexibility matters because pricing is strongly connected to fuel oil markets, refinery operating rates and shipping economics. A trader capable of managing both financial exposure and physical inventories can maintain profitability even during unstable conditions.

The current geopolitical environment has also increased the importance of neutral storage hubs and third-party terminals. Instead of exporting directly from refinery-owned infrastructure, many cargoes now move through independent terminals where products can be stored

temporarily, blended, relabeled or redirected toward alternative buyers. This system has reduced the commercial importance of owning production assets.

In practical terms, refinery operators still manufacture the material, but independent traders increasingly control the timing, routing and destination of supply. In several regional markets, buyers now prioritize delivery flexibility and cargo availability more than direct refinery relationships. The bitumen market demonstrates this transition clearly because infrastructure demand continues despite geopolitical instability. Governments may postpone some projects during periods of uncertainty, but highway construction, airport expansion, industrial zones and maintenance programs rarely stop completely. As a result, countries continue requiring stable bitumen imports even when shipping conditions become difficult.

This environment has strengthened the position of logistics-focused trading companies operating from Dubai, Geneva, Singapore and Mediterranean trading hubs. Rather than investing billions into refinery construction, these firms concentrated on storage leasing, freight coordination, cargo aggregation and blending operations. The result is a business model with lower infrastructure exposure but greater operational flexibility.

Over the coming years, ongoing geopolitical tension is expected to increase the strategic value of these companies even further. Shipping insecurity, fragmented trade routes, sanctions and rising insurance costs are likely to continue supporting firms that control storage systems, tanker access and alternative loading infrastructure. The strongest commercial influence in the future bitumen market may belong not to the companies owning the largest refining systems, but to those controlling inventories, freight positioning, storage terminals and cargo intelligence across multiple regions.



The header image features the United States flag on the left and the Iranian flag on the right, both waving against a blue sky with light clouds. The text is overlaid on this image.

# Behind the Scenes of Iran-US Negotiations: Is the Global Energy Market Expecting a Sanctions Explosion or the Beginning of a Rebalance?

**According to WPB**, growing diplomatic contact between Iran and the United States has become one of the most closely monitored developments across global energy markets, maritime shipping and petroleum-linked industries, including bitumen and asphalt supply chains. According to informed sources familiar with the negotiations, discussions have progressed beyond indirect exploratory communication and entered a more structured phase involving draft proposals and sequential commitments. Although no final agreement has been announced, the direction of the talks has already started influencing commercial expectations across the Middle East, Asia and parts of Africa.

The negotiations are being followed not only for their political significance but also for their potential impact on oil exports, freight costs, sanctions enforcement and the future stability of the Strait of Hormuz. Importers, refiners, tanker operators and construction-material buyers are all assessing how a possible settlement could alter the flow of petroleum products and heavy refinery outputs connected to road construction and industrial manufacturing.

Sources familiar with the discussions indicate that the negotiations currently revolve around several interconnected issues, including nuclear restrictions, maritime security, sanctions relief, frozen assets and controlled energy exports. The current atmosphere surrounding the talks is described as cautious but more serious than previous rounds of indirect communication. Officials connected to both sides have reportedly acknowledged that substantial disagreements remain unresolved, particularly regarding

the sequencing of obligations and the scale of sanctions relief tied to Iranian energy exports.

Energy-related provisions are understood to be central to the negotiations rather than secondary matters. According to informed diplomatic sources, one proposal under discussion involves phased relaxation of restrictions affecting Iranian crude oil and petroleum-related shipments in exchange for measurable nuclear commitments and broader de-escalation measures. The discussions are also believed to include mechanisms related to banking access, shipping insurance and supervision of commercial transactions involving petroleum cargoes.

Despite ongoing dialogue, sanctions enforcement linked to Iranian oil movements has not stopped. Sources familiar with the matter indicate that pressure on shipping networks, intermediary companies and certain Asian-linked import channels has continued throughout the negotiation process. This suggests that Washington intends to maintain economic leverage until formal commitments are secured and verified.

Within regional trade circles, one of the most important questions concerns the Strait of Hormuz. According to informed regional sources, maritime access and uninterrupted commercial navigation have become key components of the negotiations. The issue is especially sensitive because Hormuz remains one of the world's most strategically important shipping corridors for crude oil, refined products and petrochemical cargoes. Even limited instability around the waterway can increase tanker insurance costs, tighten vessel availability and raise freight

premiums throughout petroleum markets.

For the bitumen sector, the importance of Hormuz extends beyond crude oil alone. Shipping costs for asphalt materials, vacuum residue, fuel oil and industrial binders are heavily influenced by tanker availability and regional risk assessments. Traders operating across the Gulf, South Asia and East Africa have already been evaluating possible scenarios tied to either diplomatic stabilization or renewed

transparent commercial channels.

According to industry sources, the return of Iranian petroleum-linked exports would probably happen gradually rather than immediately. Years of sanctions, financial restrictions, banking complications and opaque shipping arrangements cannot be reversed within a short period. However, even limited normalization could increase supply competition across nearby markets. Iran's geographic position continues to provide logistical advantages for deliveries into South Asia, East Africa and Gulf-region destinations.

Regional suppliers are already monitoring the talks carefully. In the event of a settlement, exporters in the Gulf would likely face stronger competition over freight efficiency, payment conditions and delivery reliability. Market participants in Iraq, the UAE and Bahrain are believed to be reviewing possible commercial responses in anticipation of any easing of restrictions affecting Iranian shipments.

Asian buyers are also expected to reassess procurement strategies if sanctions are partially relaxed. China remains deeply connected to discussions surrounding Iranian crude flows, while Indian refiners are expected to monitor any legal opening connected to maritime insurance and payment processing. Within the bitumen trade, importers in South Asia could gain additional negotiating flexibility if Iranian cargoes become easier to finance and transport through regular shipping systems.

In Africa, especially East Africa and selected West African markets, the consequences could emerge more gradually but remain commercially significant. Many infrastructure programs across the continent depend heavily on imported road-construction materials and petroleum-derived binders. According to trade analyst's familiar with African procurement systems, some buyers may eventually consider Iranian-linked material if maritime conditions stabilize and transaction procedures become less restrictive.

The nuclear dimension remains the most complicated element of the negotiations. Sources familiar with

confrontation.

If an agreement is ultimately finalized, the first consequences would likely emerge in market sentiment rather than physical supply volumes. Freight premiums could soften, emergency risk pricing might decline and buyers may adopt a more cautious procurement strategy while waiting for clearer export conditions. Some importers may temporarily slow purchases from alternative suppliers in anticipation of additional Iranian-origin material returning to more





the discussions suggest that verification mechanisms involving uranium enrichment levels, inspection access and monitoring procedures are still under intense debate. Without a credible verification process, many commercial observers believe any agreement would remain vulnerable to political reversal or future sanctions disputes.

Political uncertainty on both sides also continues to complicate the process. Within Washington, any arrangement perceived as overly accommodating toward Tehran could face criticism from domestic political groups and regional allies. Inside Iran, concessions related to enrichment activity or inspection access may trigger resistance from hardline factions skeptical of long-term cooperation with the United States. Regional governments across the Gulf are also closely watching whether the negotiations remain narrowly focused on nuclear and maritime issues or eventually expand into broader security matters.

According to informed diplomatic sources, the most realistic outcome at this stage appears to be a phased and limited arrangement rather than a sweeping comprehensive agreement. Early stages could involve maritime guarantees, partial sanctions adjustments and controlled energy exports, followed later by technical verification and additional commercial access measures. A complete return of Iranian petroleum exports to unrestricted international markets would likely require a longer political process.

For bitumen exporters and petroleum-linked suppliers, the current environment requires caution rather than aggressive positioning. Sellers are expected to review freight exposure, sanctions clauses, payment structures and alternative loading options while avoiding overcommitting to long-term pricing assumptions before clearer political outcomes

emerge. Market stability may improve if negotiations continue positively, but uncertainty remains substantial.

For buyers, diversification remains the safest commercial strategy. Importers are expected to maintain multiple sourcing options while carefully monitoring shipping regulations, banking conditions and insurance requirements tied to Middle Eastern cargoes. Industry analysts believe disciplined buyers will prioritize compliant transactions, documented supply chains and financially secure delivery structures over short-term price opportunities alone.

At the present stage, the negotiations should not yet be interpreted as a completed geopolitical settlement. They remain a fragile diplomatic process involving unresolved nuclear, economic and maritime questions. Nevertheless, the talks have already started influencing expectations across energy, shipping and asphalt-related industries. If maritime stability improves and energy restrictions are gradually eased, regional petroleum trade could enter a more competitive and commercially stable period. If the negotiations fail, markets may quickly return to elevated freight risk, defensive procurement strategies and renewed uncertainty surrounding Gulf shipping corridors.



# Stepping Out of the Middle East Shadow: Brazil's Roadmap to Reshaping the Bitumen Market Equations

According to WPB, Tension across the Middle East and recurring security concerns around the Strait of Hormuz have accelerated interest in alternative supply corridors for energy-linked commodities, including bitumen and asphalt feedstocks. In recent months, Brazil has gained renewed attention among importers, traders, shipping firms and infrastructure investors seeking long-distance supply reliability outside the Gulf region. While Brazil has never been considered a dominant force in global bitumen exports, recent developments inside the country's refining sector, logistics network and public infrastructure agenda have started to reposition its role within several international supply chains connected to road construction materials and petroleum derivatives.

Brazil's response to instability linked to the Gulf shipping corridor has remained cautious and commercially focused. Officials avoided direct alignment with escalating geopolitical rhetoric while emphasizing the importance of uninterrupted maritime trade. Within industrial circles, however, the situation triggered renewed assessments of refinery flexibility and export potential. Brazilian refiners and infrastructure contractors have increasingly examined how disruptions in Middle Eastern shipping lanes could alter freight economics for asphalt products, vacuum residues and heavy refinery outputs used in road construction.

Several export terminals along Brazil's Atlantic coastline have quietly expanded operational activity linked to petroleum byproducts over the past year. The ports of Santos, Paranaguá, Itaquí and Suape have become increasingly relevant for shipments connected to paving materials, industrial binders and refinery-derived construction products moving toward African and Latin American destinations. Industry sources inside Brazil's logistics sector report that some exporters have also explored indirect shipment structures involving Caribbean storage hubs to improve flexibility during periods of freight uncertainty.



Trade data reviewed by regional infrastructure analysts indicate that Brazilian bitumen-related exports remain modest compared with Gulf suppliers, yet their strategic significance has increased due to diversification concerns among buyers. Latin American demand for paving materials has risen sharply as governments continue large-scale highway rehabilitation programs following years of underinvestment. Brazilian suppliers have particularly benefited from proximity advantages in Atlantic shipping routes serving West Africa and parts of Central America. Inside Brazil, the domestic infrastructure agenda has become deeply intertwined with political negotiations surrounding public spending.

Federal authorities have promoted road construction as both an economic stimulus mechanism and a visible political instrument ahead of regional electoral cycles. Large paving contracts have therefore become closely monitored by investment groups, fuel distributors, engineering firms and state-controlled industrial entities competing for influence over procurement structures.

The relationship between private refiners and state-linked energy institutions has also entered a more competitive phase. Petrobras continues to maintain enormous influence across refining logistics and heavy petroleum processing, yet a growing number of independent fuel and infrastructure

groups are attempting to secure greater access to asphalt distribution markets. This competition has intensified discussions over refinery modernization, terminal access rights and transportation subsidies linked to construction materials.

Several Brazilian states have launched programs encouraging local sourcing of paving inputs in order to reduce dependence on imported refined materials. These policies have opened opportunities for domestic asphalt blending operations while also triggering disagreements between private contractors and state-affiliated suppliers regarding pricing frameworks and delivery obligations. Analysts following Brazil's construction sector say the dispute is less about immediate shortages and more about long-term control over procurement systems attached to federal infrastructure budgets.

Lobbying activity connected to road spending has become increasingly visible in Brasília during the past year. Construction associations, fuel transport groups, agricultural exporters and regional governors have all attempted to influence the allocation of infrastructure financing. Highway expansion remains politically valuable because it directly affects agricultural exports from Brazil's interior regions toward Atlantic ports. Asphalt procurement therefore carries implications extending beyond construction alone, touching freight competitiveness, export efficiency and regional employment.

At the same time, environmental pressure surrounding petroleum-based construction materials has intensified. Brazil's academic sector and several regional engineering laboratories have accelerated research into bio-bitumen alternatives derived from agricultural waste, sugarcane residues, lignin compounds and biomass processing byproducts. These initiatives have attracted growing interest because Brazil possesses one of the world's largest agricultural economies and therefore generates enormous volumes of organic industrial residue suitable for conversion technologies.

Researchers connected to universities in São Paulo, Paraná and Minas Gerais are currently examining how biomass-derived binders could partially replace petroleum-based asphalt in selected road applications. Early-stage pilot projects have focused on durability under tropical climate conditions, moisture resistance and lifecycle

maintenance costs. Government agencies monitoring low-carbon infrastructure financing have expressed interest in supporting broader field testing over the next several years. The discussion surrounding bio-bitumen inside Brazil differs noticeably from sustainability campaigns commonly observed in Europe. Rather than emphasizing climate branding alone, Brazilian industrial planners increasingly frame biomass asphalt as a strategic industrial opportunity capable of reducing refinery pressure while simultaneously creating additional value streams for the agricultural sector. This approach has gained support among agribusiness organizations seeking new industrial markets for crop-processing waste.

International commodity groups are also monitoring Brazil's biomass asphalt research because successful commercialization could influence future export dynamics across Latin America. Several regional infrastructure ministries have already begun discussing low-carbon road materials within procurement guidelines tied to multilateral financing institutions. If Brazil succeeds in scaling agricultural-based asphalt binders, the country could eventually secure a stronger position within infrastructure supply chains extending beyond South America.

Portuguese-language business media inside Brazil has devoted growing attention to these developments, although much of the reporting remains absent from English-language energy coverage. Local investigative outlets have recently examined disagreements surrounding refinery asset sales, allegations of preferential infrastructure contracting and disputes between transportation ministries and regional authorities over project sequencing. Some reports have also highlighted concerns regarding the concentration of logistics influence among a relatively limited group of fuel distribution and construction interests.

Shipping executives operating along Brazil's Atlantic corridor have meanwhile identified Africa as a particularly important destination for future expansion. West African infrastructure growth and rising urbanization continue to support demand for paving materials, while shipping distances from Brazil remain commercially attractive compared with certain Asian suppliers. Brazilian exporters have therefore increased market intelligence activity focused on Angola, Ghana, Ivory Coast and Senegal.

Market observers additionally note that Chinese

construction financing across Latin America has indirectly benefited Brazil's asphalt-related industries. Road expansion linked to agricultural exports and mining logistics frequently requires substantial volumes of paving materials, encouraging refiners and infrastructure suppliers to maintain higher operational flexibility. Some Brazilian contractors are now evaluating partnerships involving recycled asphalt technologies and polymer-modified materials intended for heavy cargo corridors.

Despite growing international attention, Brazil still faces substantial structural obstacles before emerging as a major global bitumen force. Refinery capacity constraints, domestic political uncertainty, transportation bottlenecks

and fluctuating public spending continue to limit rapid expansion. Nevertheless, the country's combination of agricultural resources, Atlantic shipping access and expanding infrastructure ambitions has created a distinctive position within the evolving global asphalt landscape.

For importers seeking diversification beyond traditional Gulf supply patterns, Brazil increasingly represents more than a secondary regional source. The country is becoming part of a wider conversation involving supply resilience, low-carbon construction materials and infrastructure financing competition. As instability periodically reshapes global freight calculations, Brazil's asphalt and bitumen sector may continue gaining relevance far beyond South America.

## From Refineries to Highways: The Return of Sulfur Modified Bitumen to Infrastructure Projects

62 According to WPB, Governments across Asia and the Middle East are quietly revisiting sulfur-extended bitumen as pressure grows on refiners to manage rising sulfur inventories while reducing dependence on conventional bitumen consumption in road construction. What was once treated as a narrow industrial experiment is now being examined as a practical infrastructure material tied to refinery economics, road durability, emissions management, and long-term procurement costs. The renewed attention comes at a time when many refining centers are producing larger sulfur volumes because of stricter fuel standards, while public infrastructure budgets remain under pressure from expensive petroleum-derived construction materials. In several markets, sulfur modified bitumen is no longer discussed as a laboratory curiosity but as a potential industrial buffer capable of absorbing refinery byproducts into large-scale paving systems.

The origins of sulfur use in bitumen trace back to the United States and Canada during the energy and infrastructure programs of the 1970s. Researchers in North America first explored sulfur as a partial replacement for bitumen during periods of petroleum instability and supply concern. Early pilot studies were carried out in Texas, Alberta, and several federal highway programs where sulfur was blended into hot mix bitumen mixtures to reduce binder demand and improve resistance against deformation under heavy traffic. At that time, the concept was mainly driven by economics.

Sulfur was abundant and inexpensive, while bitumen prices were volatile. The idea gained technical credibility after controlled field trials demonstrated that sulfur-enhanced mixtures could increase stiffness and lower binder consumption without immediately compromising pavement performance.

Commercial activity later expanded beyond North America. Russia became one of the earliest countries to integrate sulfur bitumen into industrial-scale road construction because of its large sulfur output from oil and gas processing. Soviet-era infrastructure institutes examined sulfur binders for cold-climate applications, especially in regions where transporting conventional bitumen was expensive. In the decades that followed, sulfur modified bitumen projects appeared in Kazakhstan, Poland, China, and parts of the Gulf region. China accelerated research after rapid highway expansion increased demand for paving materials. Chinese institutes focused heavily on sulfur polymer formulations capable of reducing thermal cracking and extending pavement life under extreme temperature cycles. In the Middle East, pilot projects emerged in Saudi Arabia, the UAE, and Qatar, where refiners faced rising sulfur accumulation linked to cleaner fuel regulations.

Operational use today varies significantly between countries. China has conducted some of the most active industrial trials in recent years, especially in Xinjiang and Inner Mongolia, where sulfur logistics align closely with refining

infrastructure. Russia continues to use sulfur enhanced bitumen mixtures in selected regional projects connected to heavy freight corridors. Canada has maintained research partnerships involving sulfur bitumen for northern climate conditions. In the Gulf, sulfur bitumen remains mostly within controlled demonstration projects rather than nationwide deployment, although technical evaluations continue because regional refiners possess substantial sulfur reserves that often exceed domestic chemical demand.

The economic argument behind sulfur bitumen is straightforward but not universally convincing. Sulfur can partially replace bitumen content in bitumen mixtures, reducing dependence on expensive petroleum derived binders. In theory, this lowers construction costs when sulfur prices remain significantly below bitumen values. Refiners also benefit because sulfur stockpiles represent both storage expenses and environmental liabilities. Converting sulfur into road construction material creates a secondary industrial outlet that can stabilize refinery operations. For countries with large refining sectors and ambitious infrastructure plans, sulfur bitumen appears attractive because it links waste management with transportation development.

However, large-scale commercialization faces major technical and financial barriers. Sulfur behaves differently from traditional bitumen under varying climate conditions. Excess sulfur concentration may increase brittleness, particularly in colder environments where cracking risks are already high. Hydrogen sulfide emissions during mixing and paving remain a serious occupational concern unless advanced stabilization technologies are used. Specialized additives and polymer modifiers are often required to maintain long-term pavement flexibility, which increases production complexity and operational cost.

Another issue involves standardization. Most road authorities still rely on pavement specifications developed around conventional bitumen systems. Sulfur modified bitumen requires separate testing protocols covering aging resistance, fatigue performance, thermal sensitivity, and environmental emissions. Without internationally harmonized standards, contractors remain cautious about adopting sulfur heavy formulations for critical infrastructure.

Despite these limitations, sulfur bitumen is attracting renewed attention because of broader structural changes inside the global refining industry. Ultra low sulfur fuel regulations have dramatically increased sulfur recovery rates at refineries worldwide. This means many refining complexes are generating more sulfur than traditional fertilizer and

chemical markets can absorb efficiently. Some analysts believe sulfur surplus management may become a strategic industrial challenge over the next decade, particularly in Asia and the Middle East where refining capacity continues to expand. Under these conditions, road construction offers one of the few sectors capable of consuming sulfur at very large volumes.

The bitumen market itself could experience indirect pressure if sulfur modified systems expand meaningfully. Sulfur is unlikely to replace conventional bitumen entirely because paving systems still require hydrocarbon binding characteristics that sulfur alone cannot provide. Yet partial substitution could influence demand patterns for paving grade bitumen in regions where sulfur availability is high and infrastructure spending remains aggressive.

Environmental assessments remain divided. Supporters argue sulfur bitumen reduces refinery waste accumulation and lowers virgin bitumen consumption. Critics counter that sulfur handling introduces toxicity risks and potential emission hazards if pavement systems deteriorate or are improperly recycled.

Whether sulfur bitumen is commercially viable on a massive global scale depends largely on regional economics rather than universal engineering superiority. Countries with large sulfur surpluses, extensive highway construction, and integrated refining sectors are the strongest candidates for expansion. In practical terms, sulfur bitumen is no longer viewed solely as an experimental paving material. It is increasingly part of wider discussions involving refinery sustainability, industrial waste utilization, and long-term transportation budgeting.





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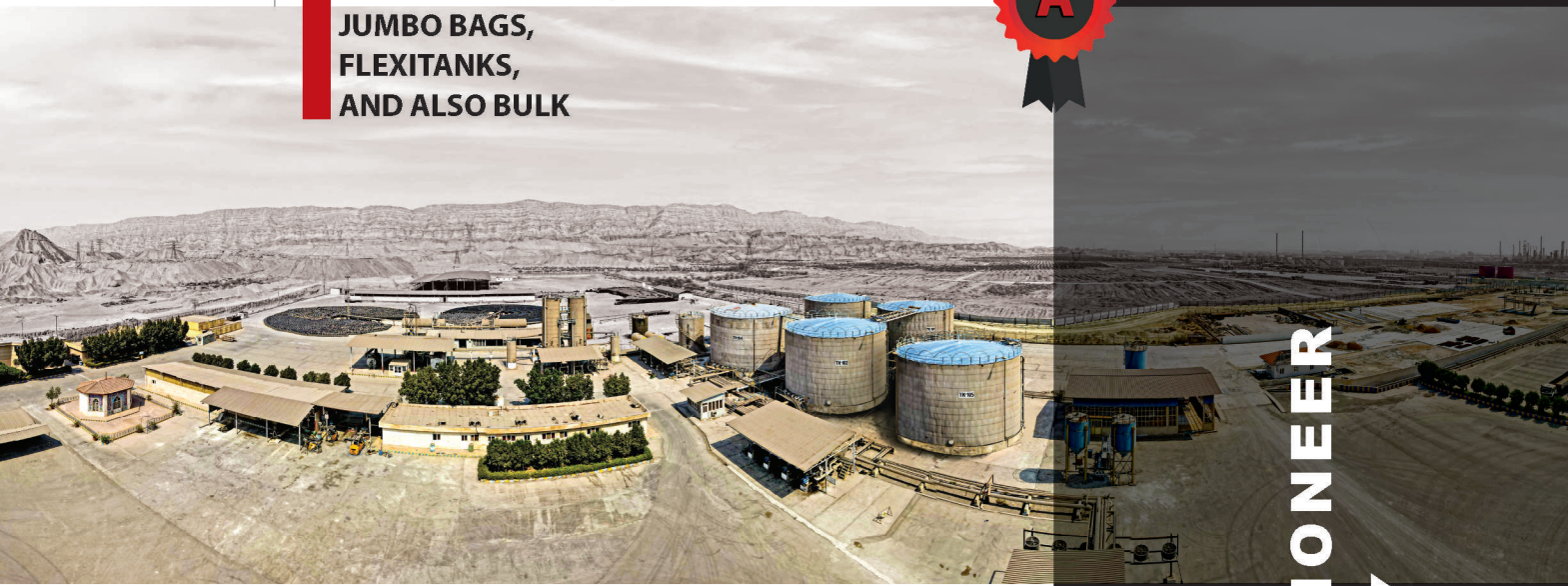


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