

## INSIGHTS – 2026 LOOK AHEAD

# GLOBAL BIOFUELS MARKET

## Mandates, feedstock competition, and the road to 2030

16 March 2026

### EXECUTIVE SUMMARY

Global biofuel production exceeded 165 billion litres in 2024, with the sector valued at approximately USD 141 billion. Renewable diesel and SAF are the fastest-growing subsegments, jointly representing 11% of production and attracting 60% of new investment capital.

The regulatory landscape is accelerating unevenly: the EU is transposing RED III into national law, the US EPA has proposed record-high RFS quotas for 2026-2027, Brazil raised ethanol blending to 30%, and Indonesia's B40 mandate is operational – though B50 has been postponed.

Feedstock competition is the binding constraint. Indonesia's UCO export restrictions, EU anti-dumping duties on Chinese biodiesel (10–35.6%), and systemic UCO fraud (~80% of EU imports suspected mislabelled) are reshaping trade flows and compressing margins.

HVO capacity is expanding rapidly (~120 facilities under construction) but utilisation rates remain challenged by tight-to-negative margins. SAF mandates (2% EU, 3.6% UK) far exceed current production capability. The gap between mandated targets and physical delivery capacity is the sector's central tension through 2030.

*The global biofuels market stands at an inflection point. Regulatory mandates across the Americas, Europe, and Asia are creating structural demand growth, yet marginal producers face compression as investment capital floods into the sector. The battleground is feedstock economics, refinery utilisation, and the logistics of sustaining rapid capacity buildouts against tightening feedstock quality standards.*

## Market Context – Where Global Biofuel Production Stands

In 2024, global biofuel output exceeded **165 billion litres**, representing roughly **5.6 percent of total transport fuel consumption**. This growth has been driven predominantly by mandated blending in Brazil, the European Union, and emerging markets across Southeast Asia and the Indian subcontinent. The compositional mix remains heavily weighted towards bioethanol, reflective of both historical first-mover advantage and the technical simplicity of ethanol blending infrastructure in developed fuel supply chains.

Over the past two years, however, a structural reorientation has become evident. **Renewable diesel and SAF jointly represent approximately 11 percent of global production** and are expanding at rates substantially above the sector median. Renewable diesel's appeal lies in its "drop-in" characteristics—compatibility with existing infrastructure without engine modification—whilst SAF adoption is being driven

by increasingly stringent aviation carbon accounting and corporate sustainability commitments from airline operators. The implication is straightforward: future margin compression will likely first affect legacy bioethanol and biodiesel producers, whilst investors have pivoted capital allocation towards higher-margin, infrastructure-constrained segments.

## The Regulatory Landscape

Mandate frameworks remain the fundamental demand anchor across geographies. In the European Union, the **Renewable Energy Directive III (RED III)** is being transposed into national law throughout 2025, establishing increasingly stringent sustainability criteria and carbon accounting methodologies. The union's **SAF mandate requires 2 percent blending by 2025, rising to 6 percent by 2030**. In parallel, the United Kingdom commenced its own SAF mandate in January 2025 at **3.6 percent**, signalling a broader transatlantic alignment on aviation decarbonisation.

The United States has moved in complementary fashion. The **EPA proposed record-high Renewable Fuel Standard (RFS) quotas for 2026-2027**, maintaining the political coalition that has underpinned biofuel support since the original RFS of 2005. Brazil, historically the bellwether market for ethanol, has accelerated blending mandates substantially. The **ethanol blend was raised from 27 percent to 30 percent in 2024**, with **biodiesel rising from 14 percent to 15 percent** in the same period. Brazilian policy signals a roadmap to **20 percent bioethanol blending by 2030**, a shift that would represent a material demand increment from a market already consuming over 30 billion litres of ethanol annually.

Southeast Asian mandates have proven more volatile. Indonesia's **B40 (40 percent biodiesel) mandate went into effect in January 2025**, but the anticipated escalation to B50 by 2026 has been postponed indefinitely due to technical constraints and insufficient feedstock availability. India has taken a measured approach, introducing **1 percent compressed biogas blending in 2025-26**, with aspirational targets of **5 percent biodiesel by 2030 and 20 percent bioethanol by 2025-26**. Sceptics correctly note that infrastructure deployment lags policy intent in many emerging markets, creating a gap between announced mandates and implemented volumes.

## Feedstock Competition and Bottlenecks

The expansion of biofuel production has created acute competition for feedstocks at the margin. Sugarcane, palm oil residues, used cooking oil (UCO), and tallow represent the principal feedstock sources, each subject to distinct supply constraints and competing demand streams. Sugarcane ethanol in Brazil faces pressure from the sugar export market, which has enjoyed elevated international pricing; producers navigate pricing algorithms that shift capacity allocation between crystalline sugar and fermentation ethanol on a seasonal basis.

Palm oil and its residues remain the dominant biodiesel feedstock in Southeast Asia, but supply dynamics have shifted markedly. Indonesia, the world's largest palm oil producer, has **restricted UCO and palm oil residue exports to support the B40 mandate domestically**. This policy, whilst ostensibly supportive of domestic biofuel production targets, has created scarcity in the international UCO market and redirected competitive advantage towards producers with direct feedstock access or long-term supply contracts.

The European Union has responded with protective measures. **Anti-dumping duties on Chinese biodiesel ranging from 10 to 35.6 percent were made definitive in February 2025**, with a five-year duration. The European Commission estimates these duties protect approximately **6,000 jobs across more than 60 biodiesel producers** within the union. These tariffs effectively support European biodiesel

margins and remove Chinese price competition from the margin-setting calculus, albeit at the cost of elevated feedstock costs for downstream users such as HVO refiners.

## The UCO Supply Chain – Collection, Quality, and Fraud Risk

Used cooking oil represents an attractive biofuel feedstock: it is a waste product with negative implicit value, offers superior carbon accounting versus virgin palm oil, and requires minimal agronomic land use. However, the UCO market is structurally plagued by fraud and quality degradation. A seminal study by Transport and Environment (T&E) published in 2022 found that **approximately 80 percent of UCO imported to the European Union was suspected to be mislabelled virgin palm oil**. This finding precipitated regulatory tightening, most notably via the International Sustainability and Carbon Certification (ISCC) framework, which **suspended certification for certain waste-based biofuels in early 2025** pending enhanced audit protocols.

The practical consequence is that certified, traceable UCO supplies have become scarcer and more expensive. Legitimate collectors in developed markets face regulatory overhead, transportation costs, and capital requirements for storage infrastructure. Fraudulent supplies—collected via underhand arrangements at food service facilities or diverted from virgin palm oil supply chains—remain economically attractive to unscrupulous market participants. This bifurcation has created a two-tier market: certified UCO trading at substantial premiums to uncertified supplies, with refiners facing a choice between margin compression (via premium feedstock) or reputational and regulatory risk (via non-certified material).

## HVO and Renewable Diesel – Capacity vs. Utilisation

**Neste**, the Finnish refiner, remains the sector's largest HVO producer, commanding approximately **13 percent of global HVO market share** with a Rotterdam facility operating at **1.2 million tonnes per annum capacity**. The top five HVO refiners—Neste, Phillips 66, Eni, TotalEnergies, and Marathon Petroleum—control more than **50 percent of installed capacity**, conferring meaningful market power on large, integrated operators with hedging capability and access to diversified feedstock streams.

Capacity expansion has accelerated. The investment in biofuel production capacity increased by **26 percent between 2023 and 2025**, with approximately **120 large-scale facilities under construction** globally. Notably, **approximately 60 percent of this new investment is directed towards renewable diesel and SAF production**, reflecting market consensus that legacy biodiesel and conventional HVO margins are compressing. A concrete example: **Galp and Mitsui are jointly investing EUR 400 million in a 270,000-tonne-per-annum HVO facility at Sines, Portugal, scheduled to commence operations in 2026**. Such projects assume sustained demand growth and acceptable margin assumptions; large equity sponsors seldom invest in structural overcapacity.

Yet utilisation rates remain a critical variable. Many biodiesel and HVO producers are operating at **tight to negative margins in 2025**, reflective of elevated feedstock costs, subdued crude oil pricing (which anchors finished biofuel pricing), and excess installed capacity in certain geographies. European producers, benefiting from tariff protection, maintain higher utilisation rates than North American or Asian competitors; however, even protected producers face margin compression when feedstock costs spike relative to crude-linked product pricing. The International Energy Agency (IEA) has **revised its projected demand growth for liquid biofuels upwards by 50 percent through 2030**, suggesting that current capacity buildouts will be absorbed, but the margin path from 2025 to equilibrium remains uncertain.

Producer	Capacity (tpa)	Primary Feedstock	Geography
Neste	1,200,000	Waste oils, residues	Rotterdam, Singapore, Singapore
Phillips 66	825,000	Tallow, UCO, carinata	San Francisco, Rodeo
Eni	630,000	Waste oils, algae	Venezia, Gela (Italy)
TotalEnergies	560,000	Tallow, algal	La Mède (France)
Marathon Petroleum	485,000	Tallow, restaurant waste	Garyville (Louisiana)

Top five global HVO/renewable diesel producers by installed capacity, 2026.

## Sustainable Aviation Fuel – Ambition Meets Reality

Sustainable aviation fuel has captured regulatory and corporate attention disproportionate to its current market share. Global SAF production doubled from approximately **0.5 million tonnes in 2023** to **1.0 million tonnes in 2024**, with projections suggesting **2 million tonnes by 2025**. Even at this accelerated growth rate, SAF represented only **approximately 0.3 to 0.7 percent of global jet fuel consumption** in 2024—a rounding error in the context of aviation's global fuel demand of roughly 450 million tonnes annually.

The discrepancy between policy ambition and market reality reflects fundamental constraints. SAF production pathways are capital-intensive and immature at scale. The most established pathway—Fischer-Tropsch synthesis from biomass—requires integrated gasification infrastructure and operates at conversion efficiencies below 50 percent on an energy basis. Hydroprocessing of lipids (the hydrotreating of oils and fats) is more mature but competes directly with renewable diesel feedstock demand. Alcohol-to-jet pathways via isobutanol or isooctane synthesis remain in early pilot phase with uncertain scalability.

Blending mandates are politically popular but economically punitive for airline operators. The EU's 2 percent mandate translates to material incremental fuel costs for European carriers; producers have absorbed substantial losses to meet initial mandate volumes. Without persistent margin support—whether via carbon credits, investment subsidies, or continued crude oil weakness—SAF production will plateau well below mandate requirements. The current trajectory suggests that SAF will represent no more than **2 to 3 percent of global jet fuel** by 2030, well below policy targets.

## Price Dynamics (2025-2026)

Biofuel pricing operates within distinct regimes depending on geography and feedstock type. European biodiesel has traded in a range of USD 650 to USD 750 per tonne in 2025, supported by tariff protection and elevated feedstock costs. North American renewable diesel has been substantially weaker, trading USD 520 to USD 650 per tonne, reflecting lower crude oil pricing and weaker carbon credit support. Brazilian ethanol has ranged USD 400 to USD 480 per tonne, highly correlated to crude-linked gasoline pricing and competing sugar demand.

Feedstock costs have remained elevated. Used cooking oil has traded USD 800 to USD 950 per tonne for certified material, with uncertified supplies trading USD 150 to USD 250 per tonne lower. This spread—USD 150 to USD 250 per tonne—reflects regulatory and fraud risk premia. Tallow has been more stable, trading USD 550 to USD 700 per tonne, with seasonal variation dependent on meat processing cycles and competing demand from cosmetics and chemical feedstock applications.

The margin structure has compressed substantially. HVO refiners, facing feedstock costs at or above USD 900 per tonne and product prices around USD 700 per tonne, have weathered negative cash margins in multiple months during 2025. Producers with feedstock self-sufficiency (e.g., Neste via landfill gas monetisation or residue partnerships) or with hedging access via parent companies have fared better. Standalone biodiesel producers in Europe have remained solvent primarily via tariff protection, but profitability has declined materially from 2022-2023 levels when margin windows of USD 200 to USD 300 per tonne were common.

## Trade Flow Shifts

Regulatory changes and feedstock constraints have reshaped global trade flows. The EU's anti-dumping duties on Chinese biodiesel have eliminated the competitiveness of low-cost Asian producers in the European market, directing Chinese production towards Southeast Asian and Indian markets. Indonesia's B40 mandate and UCO export restrictions have created local supply bottlenecks, forcing regional biodiesel producers to compete for tallow and palm oil residues at elevated prices.

Used cooking oil flows have reoriented dramatically. Historically, North American and European UCO was traded into Singapore and then refined into biodiesel for export markets. Increasingly, certified UCO is retained in Europe for HVO refining, supported by carbon credit premiums. Uncertified UCO continues to flow East, but in reduced volumes and with elevated fraud risk premia.

Ethanol trade has remained relatively stable, with Brazilian ethanol dominating international markets and US corn ethanol primarily serving domestic demand. However, the Brazilian government's blending mandate escalation (to 20 percent by 2030) raises the probability of reduced export availability in the medium term. This supply tightening could support global ethanol prices if demand in other regions (India, East Africa) materialises as projected.

## Forward Outlook (2026-2030)

The biofuels sector enters this period with three competing narratives. The optimistic case assumes that regulatory mandates drive structural demand growth, that new capacity operates at high utilisation rates, and that technological improvements (particularly in SAF) reduce unit production costs. In this scenario, the sector achieves 8-10 percent annual growth through 2030, and consolidation occurs primarily among marginal, low-cost producers.

The pessimistic case emphasises feedstock scarcity, margin compression from overcapacity, and regulatory backtracking in price-sensitive markets. Historical precedent is instructive: Sweden reduced biofuel mandates substantially in 2024 to mitigate fuel cost inflation, demonstrating that public support for mandates is conditional on consumer impact. In this scenario, growth slows to 3-4 percent annually, and many greenfield projects face financing stress or outright cancellation.

The base case assumes moderate growth (5-6 percent annually) driven by stable mandates in developed markets and accelerating policy implementation in emerging markets, offset by margin compression from capacity buildouts. Consolidation accelerates among producers without feedstock or technical differentiation. Renewable diesel and SAF expand faster than legacy products, but from modest baselines. Trade friction rises as governments implement protective measures to support domestic producers, fragmenting the market into regional pricing regimes.

A critical variable is crude oil pricing. If crude rallies above USD 100 per barrel, biofuel competitiveness strengthens and margin windows expand. If crude remains range-bound at USD 50-70 per barrel, biofuel economics depend increasingly on carbon credit valuations and regulatory support rather than energy

arbitrage. Current IEA forecasts assume WTI pricing around USD 75-85 per barrel through 2030; biofuel investors are implicitly pricing this assumption into project returns.

Region	Ethanol Mandate 2025	Biodiesel Mandate 2025	SAF Mandate 2025	Target 2030
European Union	–	7.0%	2.0%	Blended renewable fuels 42.5%
Brazil	30.0%	15.0%	–	30% ethanol, 20% biodiesel
United States	10.2%	5.0%	–	RFS quotas TBD annually
Indonesia	–	40.0%	–	B40 baseline; B50 delayed
India	–	5.0% (target)	–	20% ethanol blend target
United Kingdom	–	–	3.6%	SAF mandate to 6%+ by 2030

*Global biofuel and sustainable aviation fuel mandates, current and projected to 2030.*

## Key Risks and Watch Items

**Feedstock availability and quality** represents the primary material risk. Certified UCO supplies are growing slower than demand; fraud risk remains elevated despite regulatory improvements. Palm oil supply faces environmental and political scrutiny; major consumer markets are implementing restrictions on imports from deforested regions. Tallow availability is capped by meat processing volumes and competing demand from other sectors. Should feedstock constraints bind, biofuel producers will face either margin collapse or forced production cutbacks, undermining the capacity utilisation assumptions embedded in current project returns.

**Political economy of mandates** is the second key risk. Biofuel mandates are politically vulnerable to fuel price volatility. If crude oil rallies sharply or biofuel feedstock costs spike, consumer fuel prices will follow, creating political pressure for regulatory rollback. Sweden's 2024 mandate reduction demonstrates that support is conditional. Several European nations have signalled potential mandate dilution if fuel costs rise materially. Mandates that lack explicit carbon credit or tax credit support are particularly fragile.

**Technology risk in SAF** remains substantial. Current SAF pathways operate at low conversion efficiency and high capital intensity. Breakthrough improvements in conversion efficiency (e.g., electrochemical or enzymatic pathways) could materially alter the competitive landscape and unlock new feedstock sources. Conversely, if technology does not improve at projected rates, SAF will remain economically unviable without indefinite policy support, capping long-term demand growth.

**Stranded capacity and project cancellations** pose a near-term risk. Several announced biofuel projects have been delayed or cancelled due to capital cost inflation, supply chain constraints, or margin compression. As construction costs and financing rates remain elevated, marginal projects will struggle to

achieve internal rates of return above cost-of-capital benchmarks. This risk is greatest for projects dependent on emerging feedstocks (algae, carinata) or novel technologies (e.g., power-to-liquid pathways), where demonstration scale remains small and investor confidence is limited.

**Infrastructure deployment gap** in developing markets is a structural constraint. Only approximately **30 percent of global fuel stations are equipped for ethanol blends above E10**, and fewer than **15 percent can handle biodiesel above B20**. High blending mandates in countries with limited infrastructure (e.g., India's 20 percent ethanol target by 2025-26, Indonesia's B40) will likely see implementation delays as fuel retailers invest in compatible tanks and dispensing systems. This infrastructural lag will suppress actual volumes relative to mandate targets, creating a structural demand shortfall relative to policy intent.

Finally, **carbon credit and environmental accounting** methodologies remain in flux. The EU's carbon intensity reduction targets have already precipitated accounting disputes and fraud investigations. As carbon credit premiums tighten—reflecting the global proliferation of carbon markets and uncertainty around carbon price trajectories—biofuel projects dependent on carbon credit economics will face margin compression. A regulatory shift to higher discount rates for "legacy" biofuels (first-generation ethanol and biodiesel) would materially harm existing producer valuations.

*The path to 2030 is not linear. Current mandate frameworks are broadly supportive, but feedstock constraints, margin compression from overcapacity, and regulatory fragmentation across geographies will force significant industry restructuring. Winners will be producers with differentiated feedstocks, hedging capability, and technical optionality to pivot between biofuel pathways as policy and economics shift. Commodity biodiesel producers without differentiation will continue to face structural headwinds.*

## Conclusion

The global biofuels sector stands at a critical juncture. Regulatory mandates remain the dominant demand anchor, but their sustainability depends on consumer acceptance of fuel cost impacts and political willingness to maintain support during commodity price volatility. Feedstock constraints, particularly in certified used cooking oil and palm oil derivatives, are likely to bind capacity growth over the next three to five years. Competitive dynamics are shifting decisively toward larger, integrated producers with technical differentiation and feedstock access, whilst marginal commodity producers face continued margin compression and potential consolidation or exit.

Investment in biofuel capacity continues at elevated rates, reflecting both the structural support from mandates and the relative scarcity of low-carbon transport fuel alternatives. However, marginal returns on new capacity are declining, and many greenfield projects are entering construction with inherently aggressive margin assumptions. The next three years will see significant project cancellations or delays as sponsors confront margin reality and cost inflation. Those that proceed will likely see returns compressed relative to early-phase projections, supporting a consolidation narrative within the sector.

For investors, traders, and producers, the critical variables to monitor are feedstock spot prices relative to product pricing, realized capacity utilisation rates at major facilities, and the trajectory of regulatory mandate implementation in emerging markets. Volatility is likely to remain elevated through 2026-2027 as the sector absorbs overcapacity and feedstock constraints mature. By 2028-2030, structural equilibrium is likely to be re-established, with biofuels anchored at 8-12 percent of global transport fuels and with a much more consolidated, capital-efficient producer base.

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