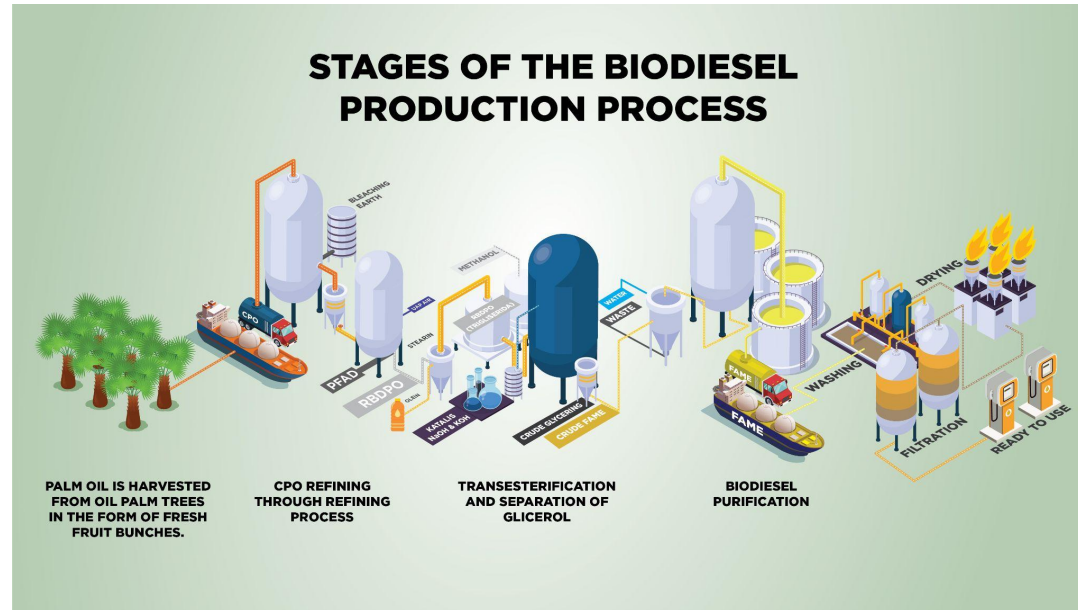


Fueling the Future of CPO: The Promise and Peril of B40 Diesel in Indonesia

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Jan 2025

Biodiesel Production Process

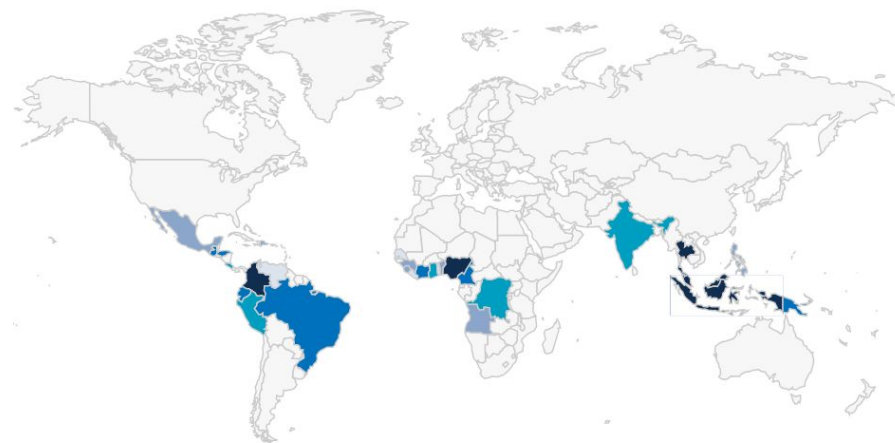


Converting crude palm oil (CPO) into diesel (biodiesel) usually involves a transesterification process, in which around 20–25% methanol (by weight of the oil) is required. This methanol is mixed with a catalyst—commonly sodium hydroxide (NaOH) or potassium hydroxide (KOH)—to speed up the reaction, and is carried out under controlled temperature (approximately 60–65°C) and reaction time (typically 1–2 hours). Key elements to address include ensuring the oil feedstock meets quality standards (low water and free fatty acid content), maintaining proper molar ratios to achieve optimal yields, and implementing efficient separation of byproducts (like glycerol).

Global Palm Oil Producers (Oct 2023 - Sep 2024)

Country	% Global Production	Total Production (Million Metric Tons)
Indonesia	57%	44.0
Malaysia	26%	19.7
Thailand	5%	3.6
Colombia	2%	1.9
Nigeria	2%	1.5

Top Producing Countries*



Palm Oil Production in Metric Tons



Global CPO Production Map*

CPO Domestic Demand

- In 2023, Indonesia's demand of 23.2 million metric tons accounts for 42% of its total annual domestic production, leaving 3.1 million metric tons as accrued stock for 2024.
- Of this demand, 44% is for food-related products, 10% is for oleochemicals (including soap, laundry detergent, cosmetics, pharmaceuticals, lubricants, plastics, rubber, and animal feed), and 46% is for biodiesel.

LAMPIRAN: STATISTIK INDUSTRI MINYAK SAWIT INDONESIA 2023

Desember

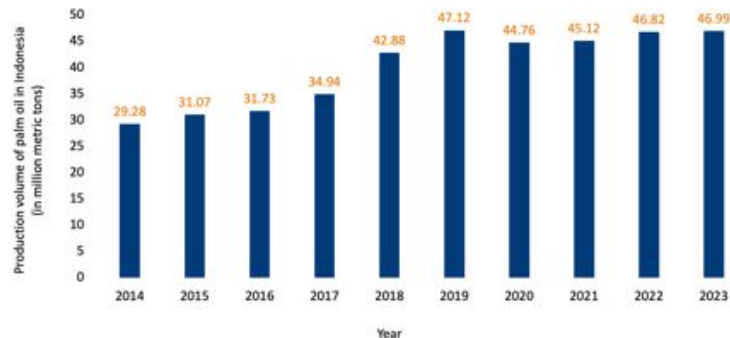
* in 1000 Ton

URAIAN (in 1000 ton)	2021	2022	2023		TOTAL 2023
			NOV	DES	
STOK AWAL (1)	4,867	4,129	2,629	3,216	3,691
PRODUKSI CPO (2)	46,888	46,729	4,297	3,996	50,069
PRODUKSI CPKO (2)	4,412	4,519	396	380	4,775
TOTAL PRODUKSI	51,300	51,248	4,693	4,376	54,844
IMPOR (3)	59	56	0	0	37
KONSUMSI LOKAL (2)					
PANGAN (2)	8,954	9,892	806	812	10,298
OLEOKIMIA (2)	2,126	2,200	188	192	2,268
BIODIESEL	7,342	9,048	947	991	10,647
TOTAL KONSUMSI LOKAL	18,422	21,140	1,941	1,995	23,213

End of year 2023 CPO statistic (uncorrected)

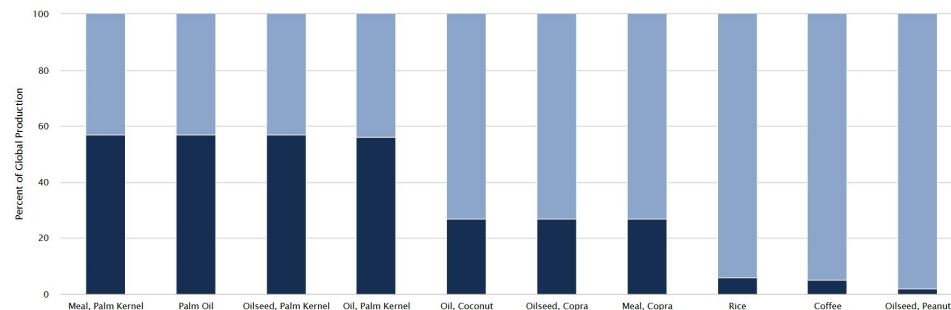
CPO Domestic Supply

- Indonesia as forefront of the global crude palm oil (CPO) industry, **produced approximately 46.99 million metric tons in 2023**, with projections indicating an increase of 1.5 million tons in 2025.
- Contributing a staggering 57% to global production**, Indonesia firmly dominates the CPO market. This unparalleled output is more than just a testament to the nation's fertile lands and optimal climate—it underscores Indonesia's potential to wield significant influence over global CPO pricing and market dynamics.
- On top of that, the **lowered export levy to 7.5%** (PMK No. 62 Tahun 2024) from previously floating with price tax scheme is expected to improve Indonesia's CPO global market competitiveness. Whether the new regulation will substantially improve export demand is still questionable. This is due to India as second largest CPO importer after China, just recently increasing their import levy.



Source: World Bank

Production volume of palm oil in Indonesia from 2014 to 2023 (million metric tons)



Percent of Indonesia top produced agriculture commodities of global production*

Indonesia Biodiesel Players (2024)

- Top 4 biodiesel buyers from the following table in Indonesia remain unchanged since 2023 which indicates the stability and dominance of major players in Indonesia's biodiesel market. This suggests **strong ongoing demand** from large-scale industrial and transportation sectors, reflecting their critical role in meeting the government's biodiesel mandate (e.g., B40).
- Similar situation is also observed on suppliers side suggests a well-established production and distribution capacity among these suppliers with **limited market disruption** or competition from new entrants.

Top 10 Biodiesel Buyers

Buyer	Total Allocation (kiloliter)
PT Pertamina Patra Niaga	10,276,851
PT AKR Corporindo Tbk	876,318
PT Exxonmobil Lubricants Indonesia	686,721
PT Kilang Pertamina Internasional	596,024
PT Petro Andalan Nusantara	187,825
PT Petromine Energy Trading	186,913
PT Sinaralam Dutaperdana II	182,150
PT Multi Trading Pratama	51,417
PT Andifa Perkasa Energi	49,074
PT Prima Transportasi Servis Indonesia	48,088

Top 10 Biodiesel Suppliers

Supplier	Total Allocation (kiloliter)
PT Wilmar Nabati Indonesia	1,566,206
PT Wilmar Bioenergi Indonesia	1,087,905
PT Kutai Refinery Nusantara	1,009,824
PT Musim Mas	990,454
PT SMART Tbk	742,638
PT Energi Unggul Persada (Bontang)	705,148
PT Pelita Agung Agrindustri	630,811
PT Energi Unggul Persada (Mempawah)	580,588
PT Eco Prima Energi	555,546
PT Batara Elok Semesta Terpadu	493,024

Indonesian Government Target on Biodiesel

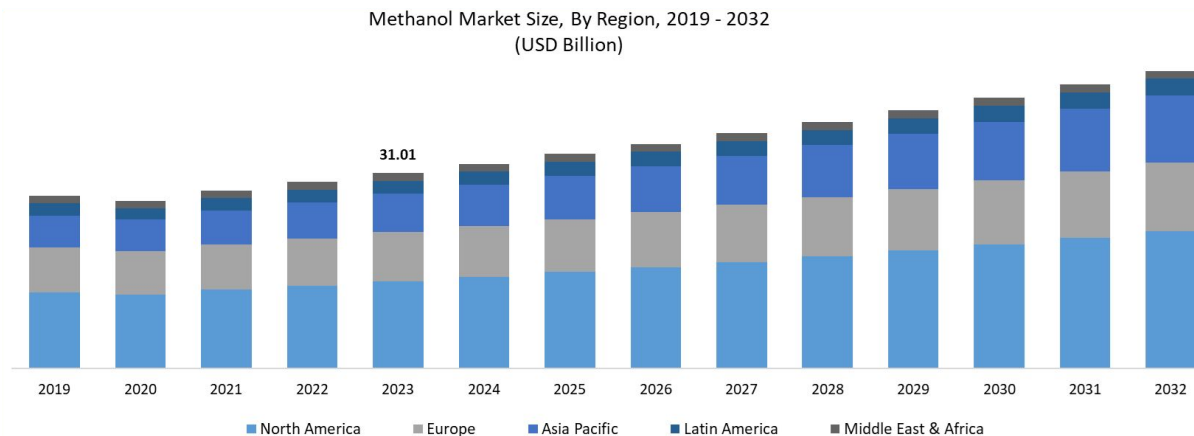
- Indonesian government plans to **escalate biodiesel mix to 40% blend (B40)** in 2025 and further to 50% (B50) by 2028. By the end of 2024, there is one large scale biodiesel plants that is under construction, which is owned by Jhonlin Group. At the moment Indonesia implements B35 mix (as of August 2023)
- The Indonesian Palm Oil Fund (BPDPKS) has expressed concerns about funding the biodiesel program, especially with the planned increase to B40. The agency anticipates a shortfall in subsidy funds due to expected **lower collections from palm oil export levies**, urging the government to reconsider its funding approach.



Biodiesel Variant

Impact on Industry

- Companies in sectors such as transportation and logistics are gradually transitioning to higher biodiesel blends. The government's clear timeline for implementing B40 (January 2025) has been seen to be quite a challenge especially in **automotive industry infrastructure** which hasn't been fully completed until today.
- Indonesia relies heavily on imported methanol to meet its biodiesel industry needs, with over **90% of domestic methanol supply sourced from international markets**. The increase in biodiesel mandates could further escalate import volumes, raising trade and cost implications, but also open up opportunity in domestic methanol market.



Increasing global methanol market size

Methanol Importance in Biodiesel

The production of biodiesel (fatty acid methyl esters, or FAME) from CPO typically involves a transesterification reaction where triglycerides (in palm oil) react with an alcohol—commonly methanol—in the presence of a catalyst (e.g., sodium hydroxide or potassium hydroxide). Given this critical role of methanol, fluctuations in methanol price and supply can significantly affect production costs and the overall economic viability of Indonesia's biodiesel program.

Notable statistics:

- Indonesia methanol production: 660,000 tons.
- Indonesia's methanol consumption exceeds 1.2 million tons in 2024.
- Indonesian gas production keep decreasing.
2021: 6,618 MMSCFD
2022: 6,588 MMSCFD
2023: 6,688 MMSCFD
2024: 6,452 MMSCFD
- There is only one large methanol producer in Indonesia, PT Kaltim Methanol Industri, which gets gas supply from the Mahakam fields.



Potential Business Opportunity: Palm Oil Mill Effluent (POME)

- Indonesia's new Minister of Energy and Mineral Resources has emphasized a strong focus on increasing the uplift of the oil and gas production sector to secure energy independence. This focus aligns strategically with the burgeoning biodiesel industry, creating an opportunity for synergy between the CPO--based bioenergy sector and traditional fossil fuels.
- One particularly promising business opportunity lies in the utilization of palm oil mill effluent (POME) from CPO **production for biomethane**. These initiatives can directly support the oil and gas sector by providing complementary renewable energy sources and enhancing Indonesia's energy mix, especially with the expected increase in CPO production next year.



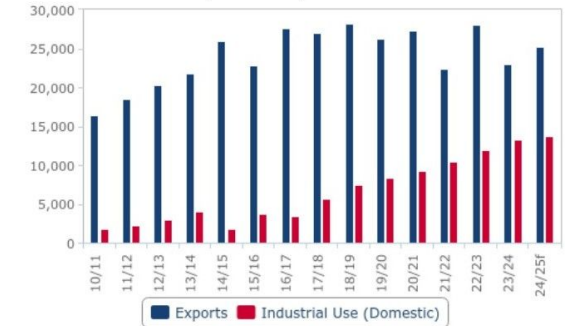
POME: liquid wastewater from CPO extraction and purification

Forecast

- The new B40 mandate is projected to require an **additional 1.5 million to 1.7 million tons** of CPO for domestic biodiesel production, equivalent to 5.7% to 6.5% of Indonesia's total palm oil exports in 2023. For exporters, the diversion of up to 6.5% of export volumes could tighten global CPO supply, potentially influencing international prices.
- Indonesia's palm oil production is projected to recover in 2025 after an expected decline in 2024. Factors such as labor shortages, high fertilizer costs, and adverse weather conditions have previously impacted output. With favorable weather conditions and improved agricultural practices, production is expected to **increase by approximately 2.3 million metric tons** in the 2024/25 season.
- The combination of increased domestic demand due to the B40 mandate and a gradual recovery in production is likely to keep CPO prices elevated in the short term. In the longer term, prices may stabilize as production continues to recover and global supply chains adjust.

Increased Biodiesel Use Will Weigh On Exportable Supplies In The Absence Of Production Growth

Indonesia - Palm Oil Use ('000 tonnes)



f = USDA forecast. Source: USDA, BMI

Biodiesel B40 will weigh on export supply

Conclusion

Climate Change and Emission Reductions

- Biodiesel emits significantly less CO₂ compared to traditional fossil fuels, contributing to Indonesia's commitment to reducing greenhouse gas emissions.
- Leveraging palm oil for biodiesel aligns with global climate goals and enhances sustainability.

Energy Independence (Swasembada Energi)

- Indonesia's biodiesel initiatives (B35/B40 mandates) demonstrate progress toward reducing reliance on imported fossil fuels.
- Developing domestic methanol production is crucial to decrease dependency on international suppliers and strengthen energy security.

Investment Opportunity in CPO Industry

- Indonesia dominates global CPO production (57% market share) and has potential for further growth with increasing domestic demand.
- The biodiesel mandate creates a robust demand for CPO, making the industry an attractive investment.
- Palm Oil Mill Effluent (POME) utilization offers additional renewable energy opportunities.

End.