

Alternative diesel can help Singapore balance resilience and decarbonisation

Biodiesel blending can provide an additional fuel pathway in times of disruption. **By Leanne Chew**

RECENT disruptions affecting oil flows through the Strait of Hormuz have highlighted how geopolitical tensions can affect global energy markets.

For Singapore, such developments serve as a reminder that security remains an important consideration alongside longer-term energy transition goals.

Singapore's transport decarbonisation strategy has appropriately prioritised electrification and vehicle efficiency improvements.

However, parts of the system are likely to remain dependent on diesel for some time.

This raises a broader question – could greater fuel diversification strengthen transport resilience during the transition?



From a resilience perspective, biodiesel's value lies not in eliminating exposure to global markets, but in reducing reliance on a single supply chain. PHOTO: BT FILE

Diesel remains important

Singapore's long-term direction towards cleaner transport is clear.

Electrification is expected to play a critical role in reducing emissions from the sector. However, the pace of transition is unlikely to be uniform across all vehicle segments.

Heavy-duty vehicles, logistics fleets and certain industrial transport applications face operational challenges, including payload requirements, long operating hours and charging considerations. As a result, diesel remains crucial for these modes of transport.

This dependence remains significant.

In 2022, diesel accounted for more than half of Singapore's road transport energy demand.

Land Transport Authority statistics indicated that Singapore had nearly 140,000 diesel goods vehicles and buses in operation in 2025.

These figures highlight the continued role of diesel in supporting freight movement, logistics operations and public transport services – the foundation of Singapore's day-to-day economic operations.

In the near term, diesel-dependent sectors, most of which have effects on

the broader economy, will continue relying on fuel supply chains that remain tied to global crude oil markets.

This is where discussions about biodiesel blending become relevant – its supply chain differs from those of conventional petroleum fuels, providing an additional fuel pathway in times of disruption.

Regional push for biodiesel

Several South-east Asian countries have incorporated biodiesel blending into their transport fuel systems.

Indonesia, the world's largest palm oil producer, began implementing its nationwide B40 programme in 2025, requiring diesel fuel to contain 40 per cent biodiesel.

The programme has generated more than 130 trillion rupiah (\$9.4 billion) in foreign exchange savings in 2025, illustrating not just the scale at which biodiesel has become integrated into the country's transport fuel system, but also the benefits accrued from it.

Building on the scheme's success, Indonesia has since moved towards implementing B50, reflecting its longer-

term commitment to biofuels as part of its national energy mix.

Malaysia and Thailand have also adopted biodiesel blending mandates, albeit at lower levels.

Although the scale and objectives of these programmes differ across countries, they demonstrate a regional turn to alternative fuel sources.

Like petroleum products, biofuels are internationally traded and remain exposed to market dynamics. But biodiesel supply chains are not the same as those of conventional petroleum fuels, which helps to diversify transport fuel systems.

From a resilience perspective, biodiesel's value lies not in eliminating exposure to global markets, but in reducing reliance on a single supply chain.

Not starting from zero

That said, Singapore's circumstances differ significantly from those of major biodiesel-producing countries.

The country does not possess the large domestic feedstock base available in major biodiesel-producing countries such as Indonesia and Malaysia.

Hence, biodiesel is unlikely to play the same role in the city-state's transport system as it does in these countries.

At the same time, Singapore is not entirely unfamiliar with alternative diesel pathways. Renewable diesel products such as R20 are already commercially available in the domestic market.

Singapore is also home to one of the world's largest renewable diesel production facilities, and has seen growing activity in marine biofuel bunkering.

These developments suggest that alternative diesel fuels are already part of Singapore's broader energy landscape.

While biodiesel and renewable diesel differ in their production processes and fuel characteristics, their presence reflects efforts to diversify beyond conventional diesel.

Rather than replicating large-scale biodiesel blending programmes adopted elsewhere, Singapore's approach is likely to be shaped by its role as a global trading, refining and bunkering hub, as well as its access to regional biofuel supply chains.

Any future role for biodiesel would therefore need to be considered within Singapore's broader energy transition and resilience strategies.

A discussion worth having

Biodiesel blending is not a substitute for electrification, nor would it eliminate Singapore's exposure to global energy markets.

Its potential role would need to be assessed alongside considerations such as feedstock availability, sustainability, economics, and compatibility with existing vehicle fleets and fuel infrastructure.

While electrification remains the long-term direction for Singapore's transport sector, diesel is likely to continue supporting freight movement, logistics operations and other essential economic activities in the near future.

As Singapore continues to strengthen its transport system for a lower-carbon future, examining how biodiesel and other alternative diesel pathways could complement existing resilience measures may help inform how decarbonisation and energy security objectives can be balanced during the transition.

The writer is a research associate at the Energy Studies Institute, National University of Singapore