



PS Energy
Group

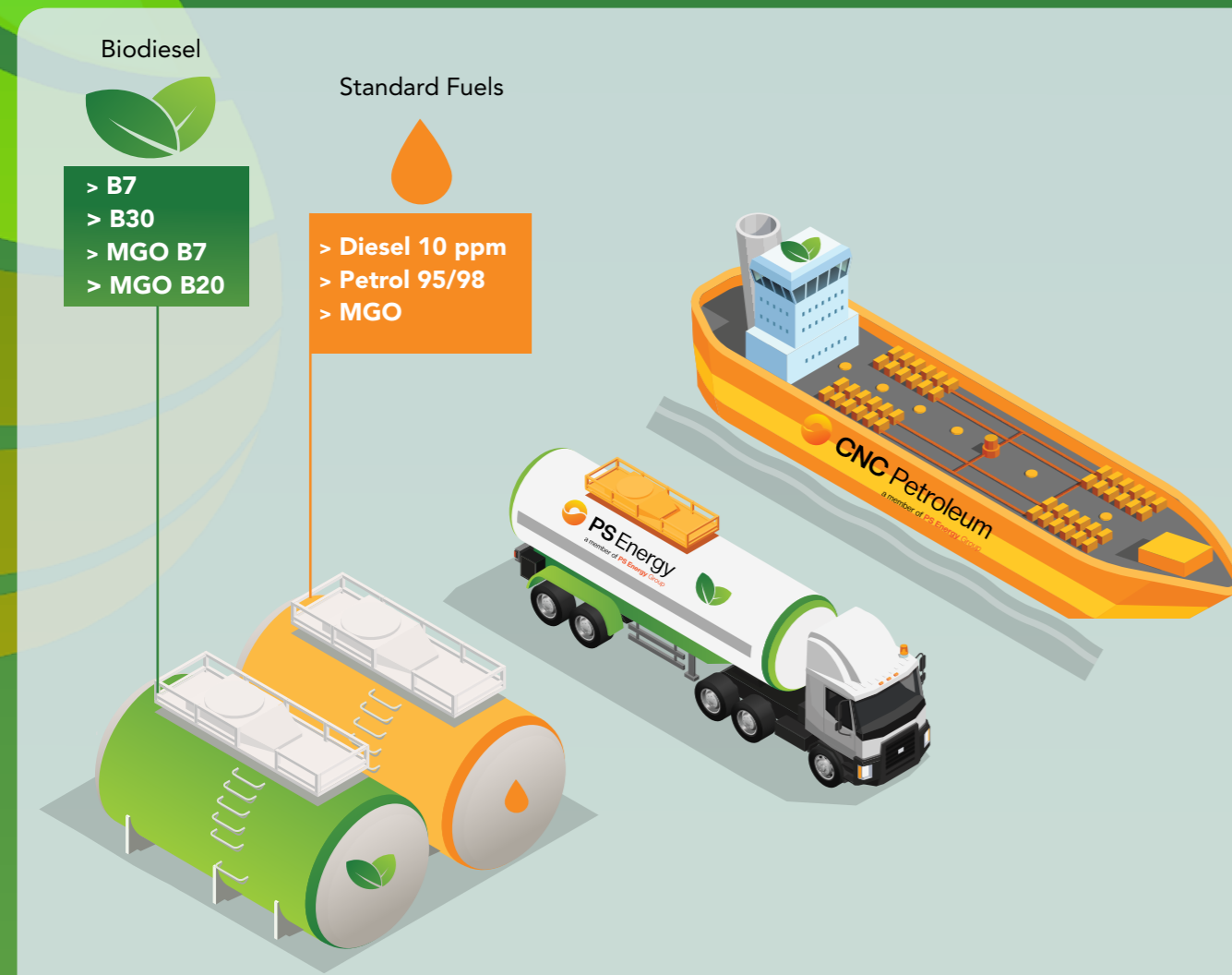
Power your business to a greener future



Following the global direction towards sustainability, we strive to contribute towards making the world a greener place.

Leveraging our strength in fuel distribution, we aspire to provide our customers with alternative options to conventional fuels.

By collaborating with an oil major partner, PS Energy successfully developed biodiesel products for inland and marine customers including B7, B30, MGO B7 and MGO B20, which can help reduce greenhouse gases (GHG) emissions.^[1]



1. National Renewable Energy Laboratory. 2011. Biodiesel Basics (Fact Sheet). p.2. [online] Available at: <<https://www.nrel.gov/docs/fy11osti/47504.pdf>> [Accessed 19 January 2022].

Helping you transition to alternative fuels

The urgency of reducing our carbon footprint is more visible than ever. Using biodiesel in heavy machinery and transport is essential if we are to transition to cleaner fuels and contribute in protecting the environment.^[2]

Together with you, we aim to create and implement alternative fuel solutions for land and sea. As a transition partner, we will accompany you in setting your sustainability goals, provide expert advice and the required support on realizing your journey towards a biodiesel-powered business operation.

2. eia.gov. 2022. Biodiesel and the Environment - U.S. Energy Information Administration (EIA). [online] Available at: <<https://www.eia.gov/energyexplained/biofuels/biodiesel-and-the-environment.php>> [Accessed 20 January 2022].



What is Biodiesel?

Biodiesel is a diesel replacement fuel for use in diesel engines. It is manufactured from vegetable oils, used or waste cooking greases or oils or animal fats, and various combinations of these oils and fats.



The biodiesel manufacturing process, known as esterification, converts these oils and fats into chemicals called long-chain mono alkyl esters, or biodiesel. These chemicals are also referred to as Fatty Acid Methyl Esters (FAME). Biodiesel produced from used cooking oil and fats is referred to as Used Cooking Oil Methyl Ester (UCOME).

Like conventional diesel, biodiesel complies with CEN standard, EN14214. In its purest form, neat biodiesel or B100 is rarely used as transportation fuel but is instead used as a blendstock to produce lower blends such as B7 (seven percent biodiesel) and B20 (20% biodiesel).

B7 and B20 biodiesels can be used in diesel

engines and existing infrastructures with little or no modifications and provides almost the same fuel consumption, horse power, and torque to engines running on petroleum diesel.^[3]

However, unlike their fossil fuels counterpart, biodiesel has lower emissions of GHGs and air pollutants including carbon dioxide, carbon monoxide, particulate matter and hydrocarbons.^[4]

Comparison of Biodiesel Blends

Diesel Type	Standard	FAME Content	GHG Emission Reduction (as compared to normal diesel)	Application
Biodiesel B100	EN 14214	100%	75% ^[4]	Mainly used as blendstock
Biodiesel B20	EN 16709	20%	15% ^[4]	Land
Biodiesel B7	NEA: EN 590	7%	5%	Land
MGO B20	WA 2:2022	20%	15%	Marine
MGO B7	ISO 8217	7%	5%	Marine

3. For B20, the differences in power, torque, and fuel economy are 1% to 2%, depending on the base petroleum diesel fuel. As the biodiesel blend level is lowered, differences in energy content become proportionally less significant compared to normal diesel. Alleman, T., McCormick, R., Christensen, E., Fioroni, G., Moriarty, K. and Yanowitz, J., 2022. Biodiesel Handling and Use Guide. 5th ed. [ebook] United States: National Renewable Energy Laboratory (NREL), p.7. Available at: <https://afdc.energy.gov/files/u/publication/biodiesel_handling_use_guide.pdf> [Accessed 19 January 2022].

4. National Renewable Energy Laboratory. 2011. Biodiesel Basics (Fact Sheet). p. 2. [online] Available at: <https://www.nrel.gov/docs/fy11osti/47504.pdf> [Accessed 19 January 2022]

Benefits of Biodiesel



Cleaner than Conventional Diesel

- Depending on the blend, can reduce lifecycle greenhouse gases by up to 88%^[5]
- Lower emissions of particulate matter which reduces smog and makes our air healthier to breathe^[6]
- Reduces hydrocarbon emissions which contains toxic compounds that cause adverse health and environmental effects^[6]



Drop-in Fuel

- Can be used as drop-in fuel. Blends of B20 biodiesel or lower require minor to no modifications to existing engines, vehicles or infrastructure^[7]
- B7 and B20 can be stored in diesel fuel tanks and pumped with the same equipment as diesel fuel.^[7] Because of biodiesel solvent and cleaning effect, users are advised to monitor potential filter clogging (with sediments) especially during initial use of biodiesel^[8]



Compliance with Standards Adopted by Local Authorities

- B7 biodiesel meets the requirements of NEA for diesel for use in Singapore, as well as the EN 590 standard, which specify a maximum FAME content of 7 vol%.
- B20 biodiesel meets the ISO 8217:2017 standard for DFA (with the exceptions of pour point, appearance, FAME and sulphur content), which is adopted by MPA for marine fuels used in Singapore

5. 2018. Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources. [ebook] p.67. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L2001&from=EN> [Accessed 20 January 2022].

6. National Renewable Energy Laboratory. 2011. Biodiesel Basics (Fact Sheet). p.2. [online] Available at: <https://www.nrel.gov/docs/fy11osti/47504.pdf> [Accessed 19 January 2022].

7. Alleman, T., McCormick, R., Christensen, E., Fioroni, G., Moriarty, K. and Yanowitz, J., 2022. Biodiesel Handling and Use Guide. 5th ed. [ebook] United States: National Renewable Energy Laboratory (NREL), p.6. Available at: <https://afdc.energy.gov/files/u/publication/biodiesel_handling_use_guide.pdf> [Accessed 19 January 2022].

8. Alleman, T., McCormick, R. et al, p.30.

Compatibility and Applications

- B7 is ASTM-approved for safe operation in any compression-ignition engine designed to be operated on petroleum diesel ^[9]
- B7 can be used in light-duty and heavy-duty diesel cars and trucks, tractors, ships, and electrical generators ^[9]
- B20 and B7 blends are approved for used by many diesel engine original equipment manufacturers (OEMs) ^{[10][11][12]}
- B20 blend represents a good balance of cost, emissions, cold-weather performance, materials compatibility, and ability to act as a solvent ^[13]
- Generally, B20 and lower-level blends can be used in current engines without modifications ^[13]

Disclaimer:
Users should always consult with their vehicle or engine manufacturer including engine warranty documentation before using biodiesel.



Construction



Marine Vessels



Airport Equipment



Buses and Fleets



Oil rigs and tower cranes



Power Supply for Events

Our Sustainable Fuels Capability

Sustainable Sourcing

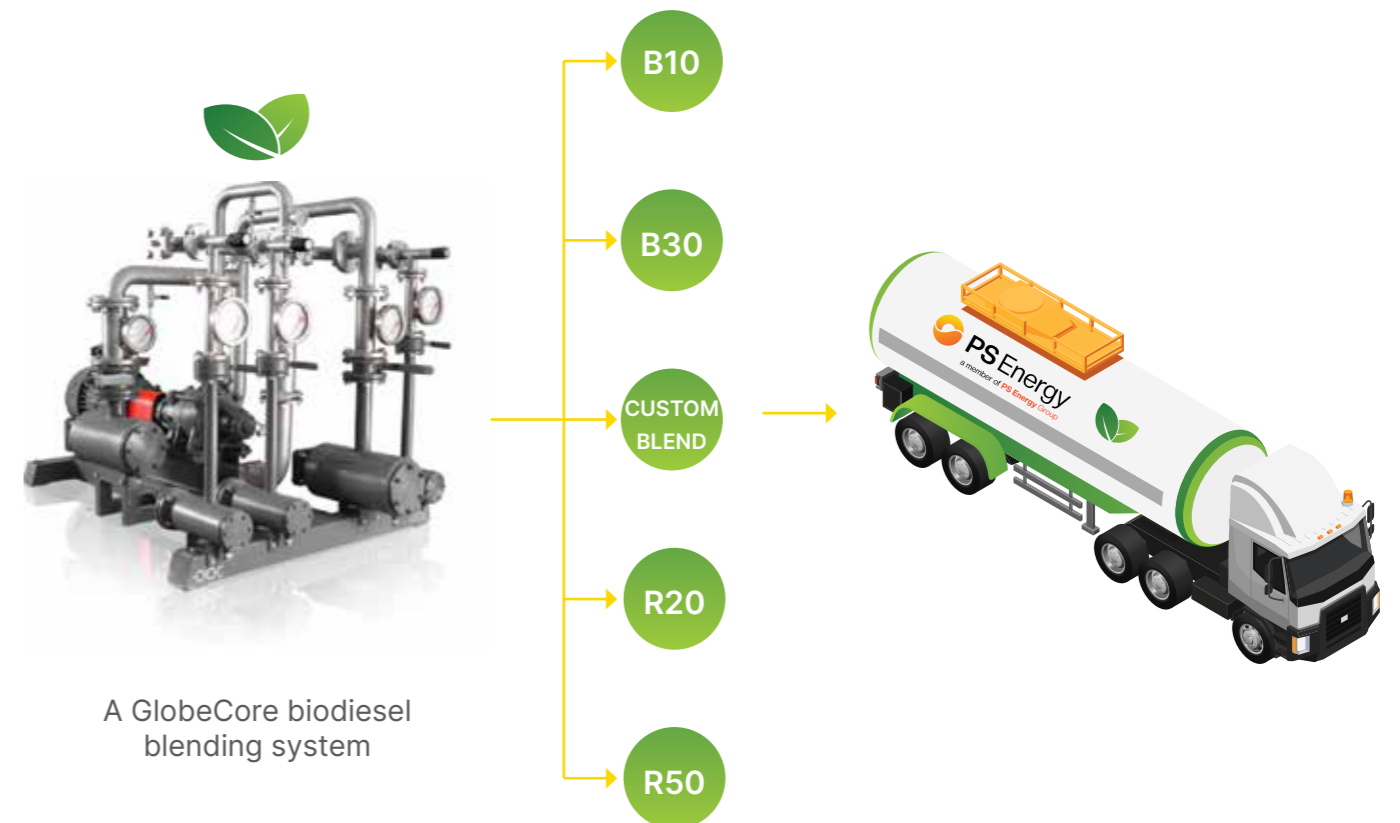
Our renewable diesel and biodiesel products exclusively utilize sustainably certified Used Cooking Oil Methyl Ester (UCOME).

Versatile Blending Capabilities

Our production and blending operations unit, PS Green Energy Pte Ltd, which is located in Penjuru and operational by next year, can produce any custom blends of renewable diesel and biodiesel with our high mix, low volume biodiesel skid unit. It can meet a wide range of requirements such as B10, B30, R20, R50, and more, tailored to the specific needs of F1 operations.

Scalable Production & Storage

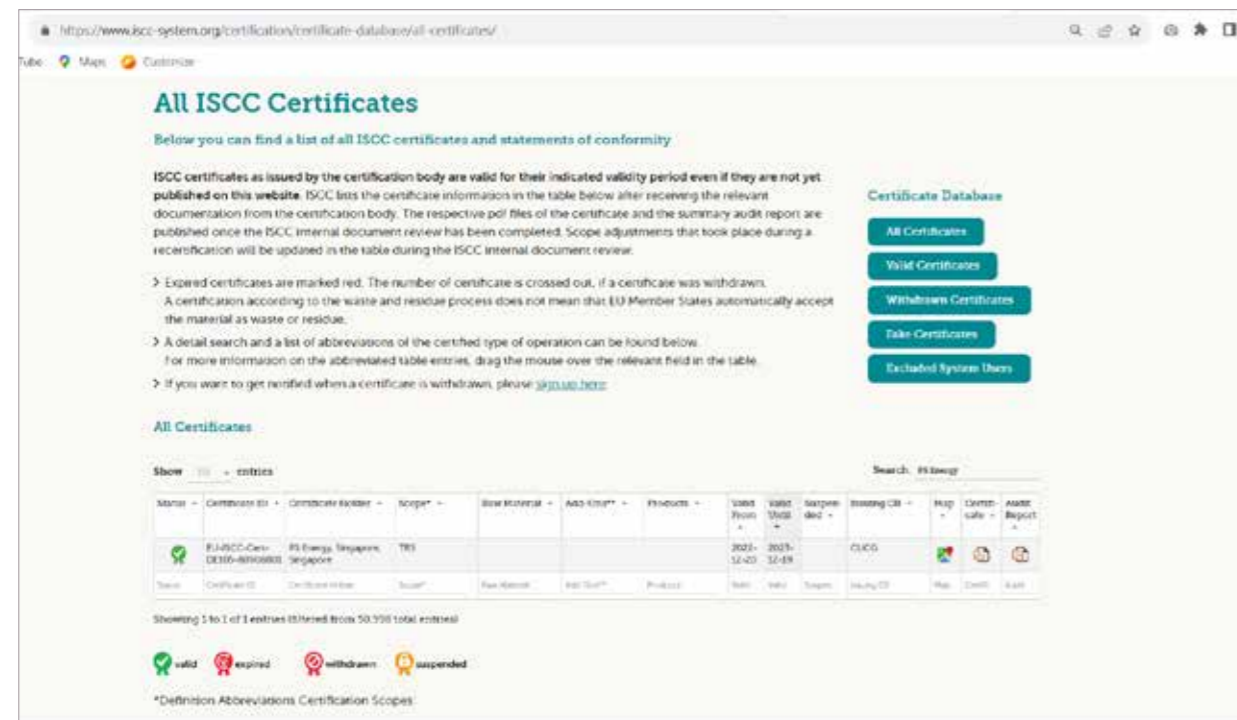
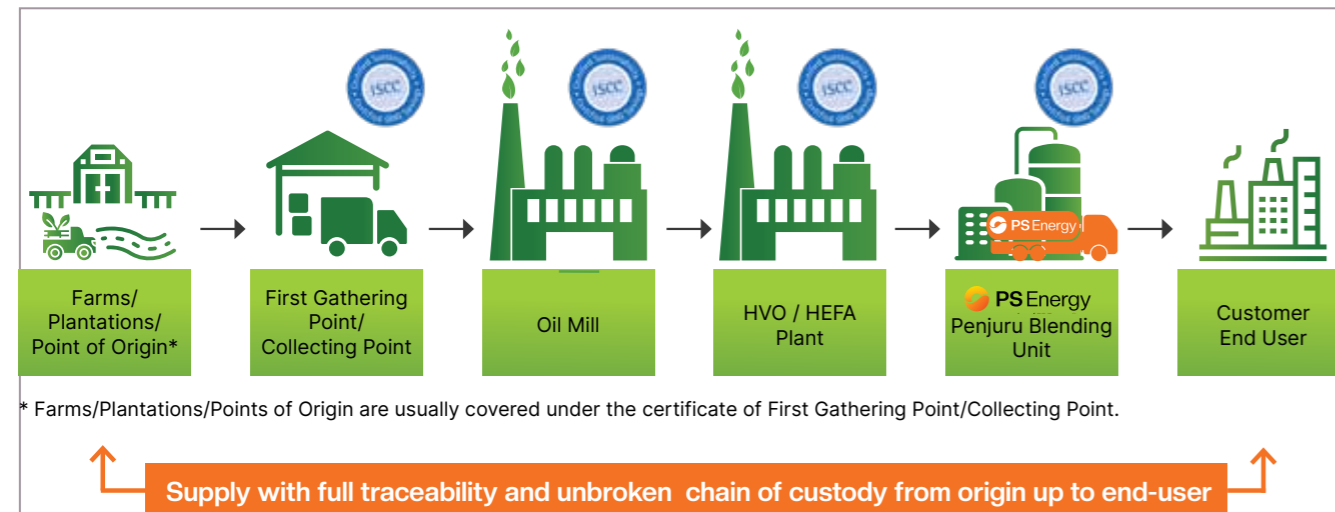
With our flexible modular design, we can scale production volume up or down at any time for small or large fuel requirements. We also have storage facilities both for feedstock and finished products which are connected to our blending unit. This allows us to customize the fuel volume and blends in advance and securely store and stockpile inventory. This guarantee consistent fuel supply for the smooth operation of F1 activities in any situation.



9. Afdc.energy.gov. n.d. Alternative Fuels Data Center: Biodiesel Blends. [online] Available at: <https://afdc.energy.gov/fuels/biodiesel_blends.html> [Accessed 20 January 2022].
 10. Kampman, B., Verbeek, R., van Grinsven, A., van Mensch, P., Croezen, H. and Patuleia, A., 2013. Bringing biofuels on the market. Options to increase EU biofuels volumes beyond the current blending limits. [online] Delft: CE Delft, p.7. Available at: <https://ec.europa.eu/energy/sites/ener/files/documents/2013_11_bringing_biofuels_on_the_market.pdf> [Accessed 20 January 2022].
 11. Dieselforum.org. 2022. Advanced Diesel Vehicles Available in the United States. [online] Available at: <https://www.dieselforum.org/diesel-drivers/advanced-diesel-vehicles-available-in-the-united-states> [Accessed 7 April 2022].
 12. Agqm-biodiesel.com. n.d. Approvals :: AGQM. [online] Available at: <> [Accessed 20 January 2022].
 13. Afdc.energy.gov. n.d. Alternative Fuels Data Center: Biodiesel Blends. [online] Available at: <https://afdc.energy.gov/fuels/biodiesel_blends.html> [Accessed 20 January 2022].

Our Green Credentials

PS Energy is part of ISCC-Certified Supply Chains that support sustainable, fully traceable, deforestation-free and climate-friendly feedstocks and renewables



PS Energy certificate listing on ISCC website

Our Track Record

A Proven Biodiesel Distributor

PS Energy stands out as one of the few Singaporean companies with a demonstrated history of supplying biodiesel to various prestigious organizations, such as the Marine Port Authority, Singapore Grand Prix, Hyundai, Singapore Navy, and the Singapore Red Cross, among others.

Supply Security

We develop and secure sustainable renewable diesel and biodiesel together with our close partners such as ExxonMobil. To scale the availability of sustainable low carbon fuel, we constantly explore new alternatives and technologies



Are you ready to transition to biodiesel but don't know where to start?

Our team at PS Energy will be glad to help.

Contact Us

Tel: +65 6861 3311

Mobile/Whatsapp: +65 9639 1819

Email: enquiries@pseg.com.sg



PS Energy Group Pte Ltd
8 Jurong Town Hall Road
#24-01 The JTC Summit
Singapore 609434

www.psenenergy.com.sg

