

Welcome to the Future of Biodiesel Web Conference

June 2022



Housekeeping Notes

- This web conference is being recorded, and the recording and presentation will be posted to my website by the end of the week.
- Transport Energy Outlook members will get a separate post with highlights and insights from the event.
- For the presentation portion, keep your lines muted and videos off.
- We will hold questions until the end. We encourage questions! The benefit of an event like this is the diversity of stakeholders present and the opportunity to dialogue. It's one of the key reasons I do this – to provide a platform for real dialogue and discussion.
 - Feel free to use the chat box
 - You can also email me directly at tammy@transportenergystrategies.com or text me at +1.703.625.1072
 - You will also have the opportunity to unmute and ask your questions directly



What Is the Transport Energy Outlook

A membership-based service that provides policy, market and technology competitive intelligence and research analysis on global transport energy issues by providing original in-depth monthly reports and posts, live events and Q&A support for members.

Deliverables

Web Conferences (4)

- Outside perspectives

Monthly Reports and Posts

- Research, analysis & intel

On-Demand Webinars (4)

- Sums up recent research & intel



Coverage

- Biofuels, Low Carbon Fuels
- Hydrogen
- Electrification
- Other Advanced Alternative and Novel Fuels
- Fuel Economy
- Car Bans
- Transport-Related Climate Change & Air Pollution Drivers
- Autonomy
- Sustainable Mobility



How to Connect with Me

- **Newsletter:** Sign up for my free biweekly newsletter at www.transportenergystrategies.com
- **Consulting Services:** <https://www.transportenergystrategies.com/consulting-services-transportation-fuels/>
- **LinkedIn:** <https://www.linkedin.com/in/tammy-w-klein-3646418/>
- **Podcast:** Fueling the Future @ <https://podcasts.apple.com/us/podcast/fueling-the-future-podcast/id1156545016>
- **Twitter:** @tammyklein



Our Speakers Today



Bruce Comer
Managing Director
Ocean Park



Scott Fenwick
Technical Director
Clean Fuels Alliance
America



Johannes Schürmann
Innovation Manager
GoodFuels



The Future of Biodiesel

Transport Energy Strategies

June 22, 2022

Bruce Comer

Managing Director, Ocean Park Advisors

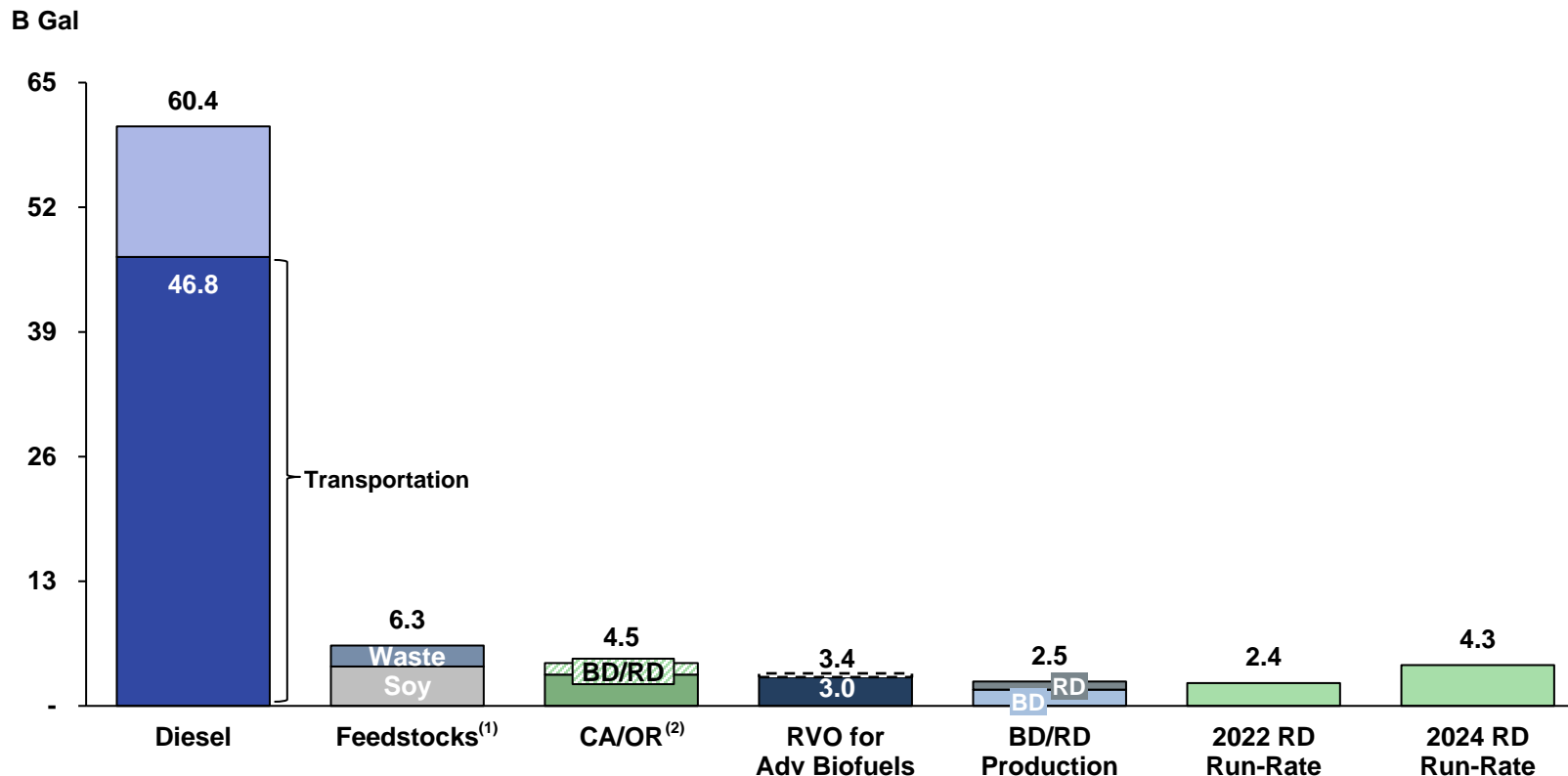
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Biodiesel and Renewable Diesel in the US

Stepping back, alternatives to diesel fuel are a small part of the US market.

2021 US Market and Production



Source: CARB, State of Oregon, EIA, Company filings and press releases, OP research and analysis.

(1) Based on a 7.5 lbs/gal conversion rate for veg oil and an 8.0 lbs/gal conversion rate for waste feedstocks.

(2) Based on YTD run rates as of June 30 for CA and Sept 30 for OR.

Policies – the RFS

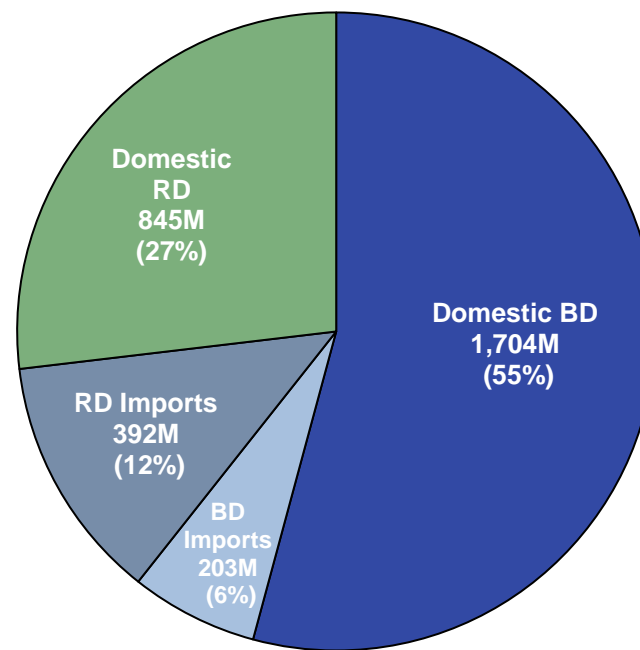
The RVO limits demand for BBD. The 2022 Adv. Biofuels RVO is equivalent to 3.3B to 3.8B gallons of BBD.

EPA Final Rulemaking

B Gal

Category	2018	2019	2020	2021	2022
Cellulosic Biofuel	0.29	0.42	0.51	0.56	0.63
Biomass-Based Diesel	2.10	2.10	2.43	2.43	2.76
Advanced Biofuel	4.29	4.92	4.63	5.05	5.63
Total	19.29	19.92	17.13	18.84	20.63
Implied Conventional (Ethanol)	15.00	15.00	12.50	13.79	15.00
Supplemental Standard ⁽¹⁾	n/a	n/a	n/a	n/a	0.25

2021 BD and RD Total = 3.1B gallons (5B RINs)



Source: EPA.

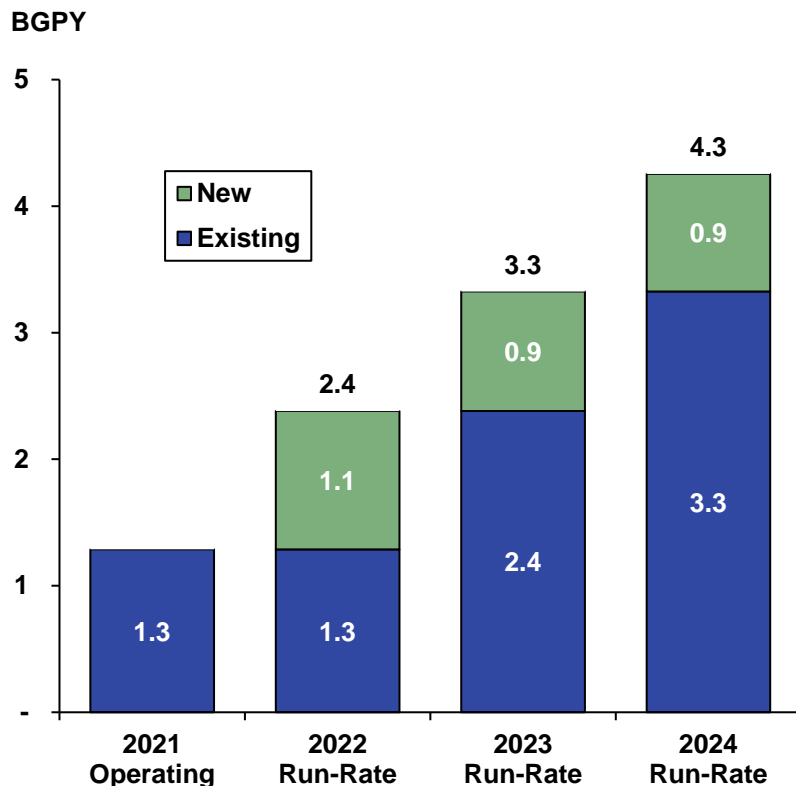
Note: Volumes are ethanol-equivalent, except biomass-based diesel which is in gallons of biodiesel.

(1) Supplemental standard obligation addresses the remand of the 2014-2016 annual rule by DC Circuit Court of Appeals in Americans for Clean Energy v. EPA.

RD Construction Boom

1.5x more capacity is slated to come online in the next 18 months than exists today.

US RD Plant Capacity: 2021 – 2024



Obligated Parties Lead the Charge

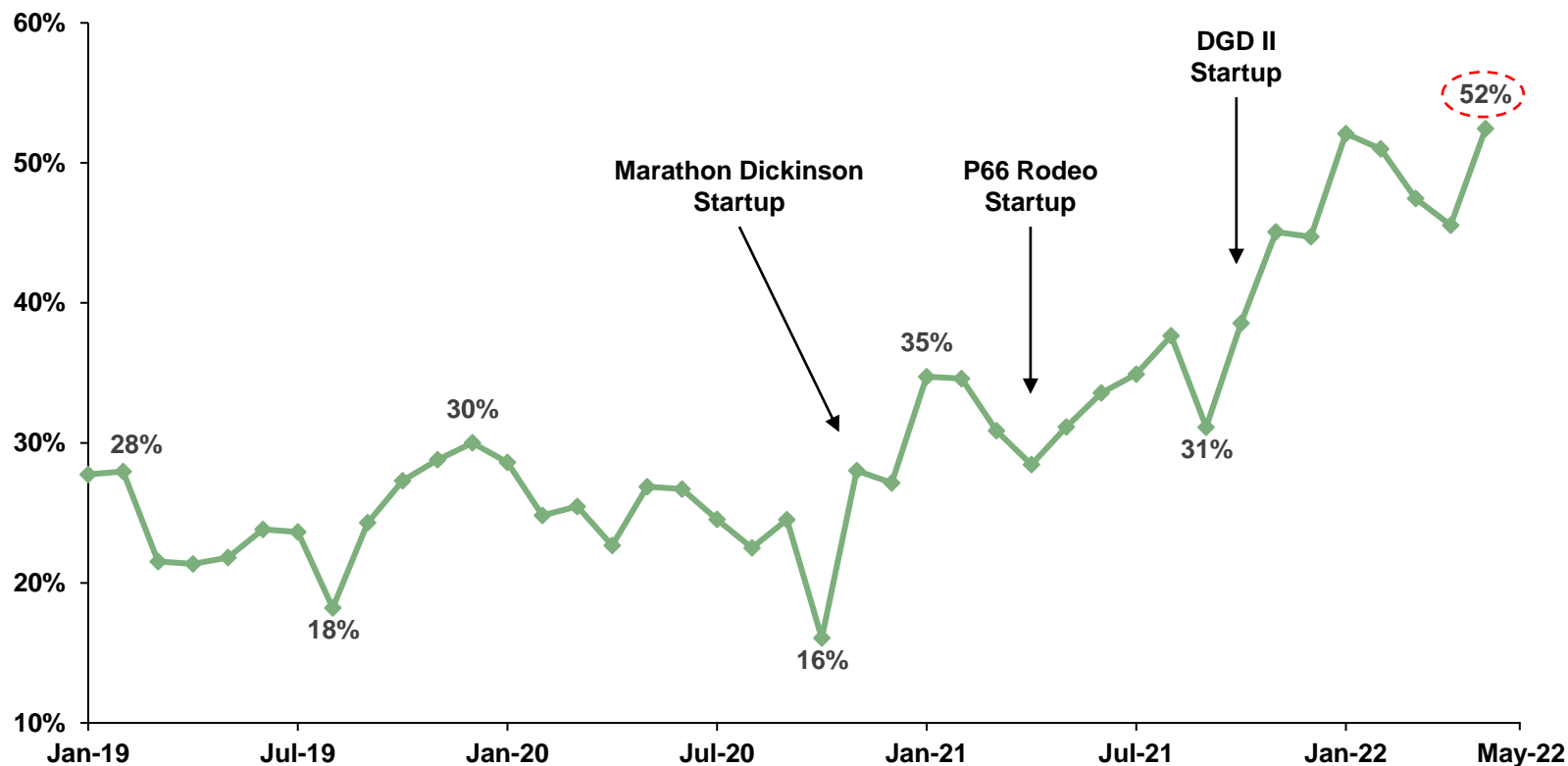
Company	Potential Gallons (B)	Potential RINs (B)
DIAMOND GREEN DIESEL	1.2	2.0
MARATHON NESTE	0.9	1.5
PHILLIPS 66	0.8	1.4
HFSinclair	0.4	0.7
CHEVRON REG	0.3	0.5
ExxonMobil Global clean energy	0.2	0.3
CVR Energy	0.1	0.2
Total	3.9	6.6
% of Total	91%	

Source: Company filings and press releases, OP research and analysis.
Note: Does not include co-processing by any other refineries.

Landmark RD Production

RD is now generating more RINs than BD in the US.

RD % of Total Domestic Production of BBD RINs

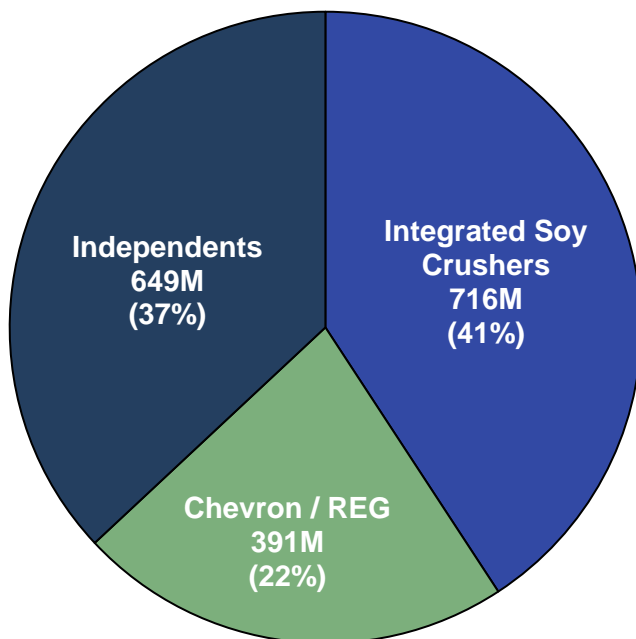


Source: EIA, EPA, company filings / websites, OP research and analysis.
 Note: Data for the period of January 2019 through May 2022.



Soy Crushers' Central Role in BD

The integrated soy crushers still lead the industry with feedstock control and low-cost economics.

2020 BD Total Production = 1,756 MGPY



2020 BD Capacity = 754 MGPY

Company	Capacity (MGPY)
 ADM	185
 AGP Ag Processing Inc	182
 Cargill	166
 LDC. Louis Dreyfus Company	99
 OGP OWENSBORO GRAIN	54
 MnSP	36
 INCOBRASA	32
Total	754

Source: EIA, NBB, Biodiesel Magazine, Company filings, OP research and analysis.
Note: BD production data as of January 2021.

The Future of Biodiesel

- Small part of the US diesel market.
- The Adv. Biofuels RVO is the underlying driver for BD and RD demand.
- The major obligated parties are “internalizing” their compliance needs.
- RD for the first time ever generated more RINs than BD does. RD will overtake BD in this regard over the next 18 months.
- Soy crushers have long played a central role in BD. Much of the future is in their decision to produce BD or sell soybean oil to RD producers.
- The macro trends point to a “rotation” from BD to RD.

BD will face headwinds, but this does not mean specific plants will not succeed.



Clean Fuels
ALLIANCE AMERICA

The Future of Biodiesel

Scott Fenwick

Technical Director, Clean Fuels

sfenwick@cleanfuels.org



Clean Fuels
ALLIANCE AMERICA

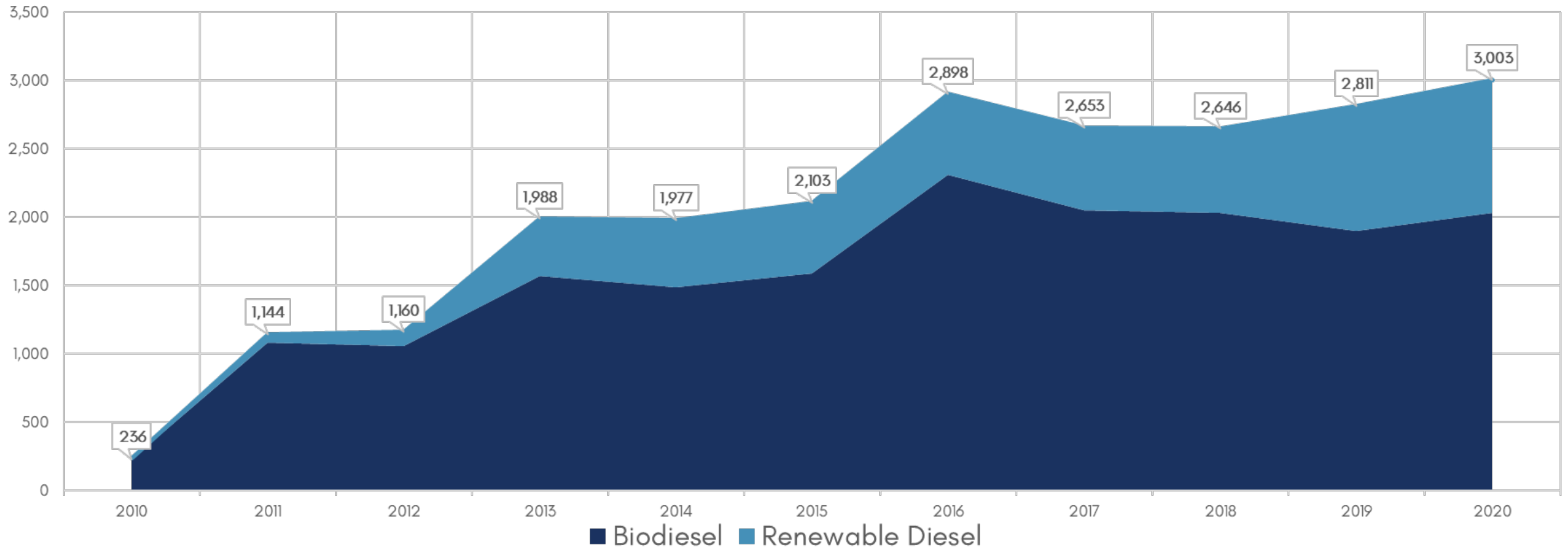
Vision 2020

Biodiesel, renewable diesel, and sustainable aviation fuel will be recognized as mainstream low-carbon fuel options with superior performance and emission characteristics. In on road, off road, air transportation, electricity generation, and home heating applications, use will exceed six billion gallons by 2030, eliminating over 35 million metric tons of CO2 equivalent greenhouse gas emissions annually. With advancements in feedstock, use will reach 15 billion gallons by 2050.



U.S. Biomass-Based Diesel Market

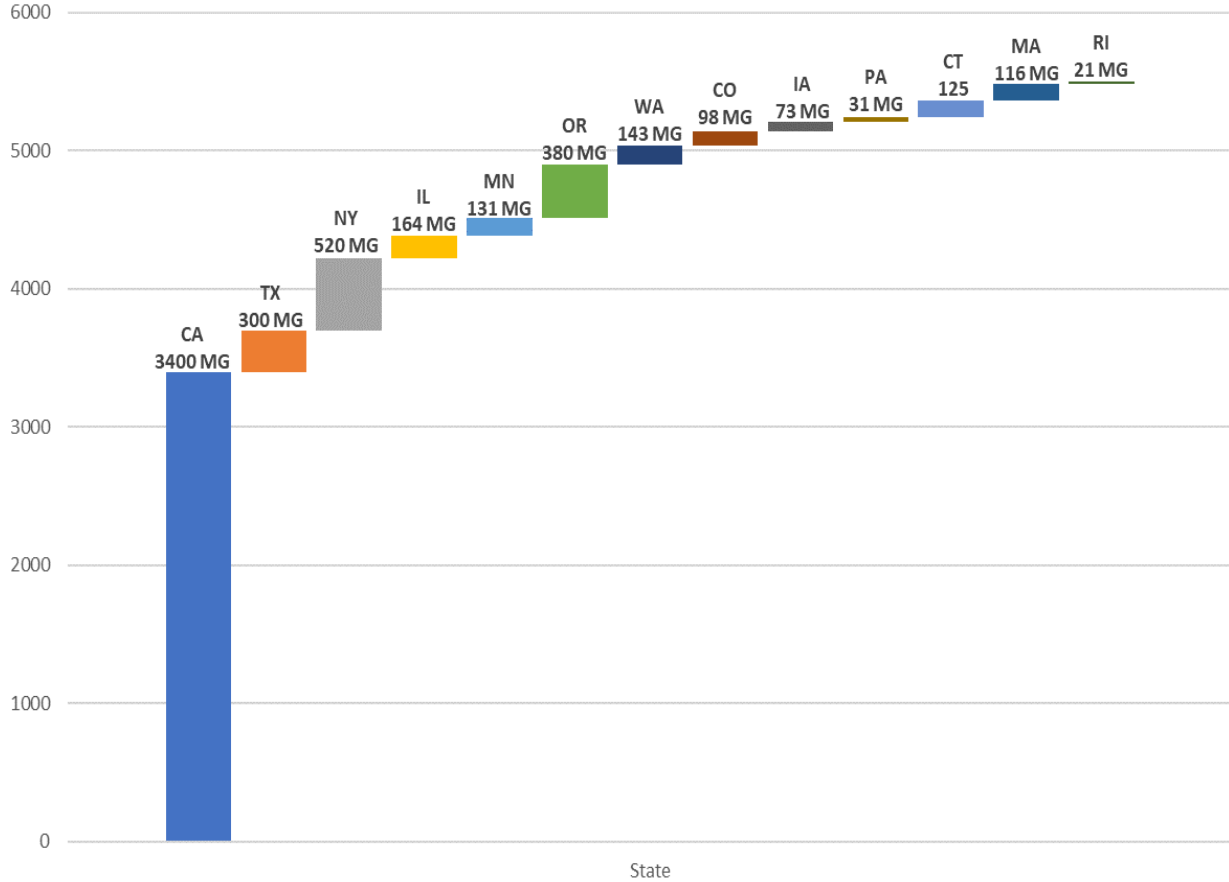
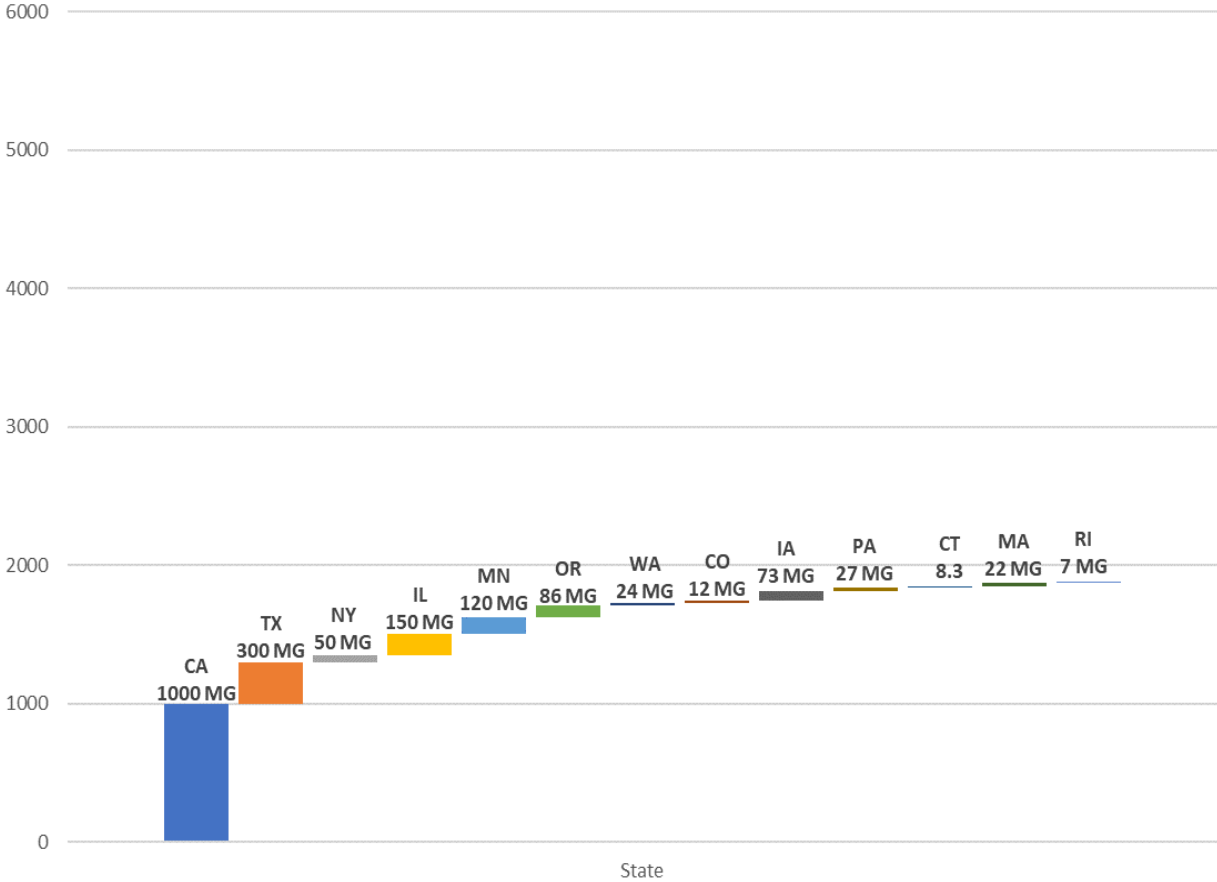
(Millions of Gallons – Source: EPA EMTS*)



*Volumes reported under the RFS in the D4, D5, and D6 categories.

2020 1.9 Billion Gallon State Market

2030* 5.3 Billion Gallon State Market



***Potential growth based on established or proposed requirements**



RD Capacity Announcements

- Existing and planned expansion of renewable diesel plants approx. 1.7 billion gallons per year of capacity.
- PLUS new announcements (many from the refining community), which include examples such as:
 - CVR Refining
 - 100 mgpy (OK) by 2021
 - Holly Frontier
 - 200 mgpy (NM and WY) by 2022
 - Marathon Petroleum
 - 725 mgpy (CA) by 2023
 - Phillips 66
 - 800 mgpy (CA) by 2024



The future of biodiesel in shipping

Johannes Schürmann

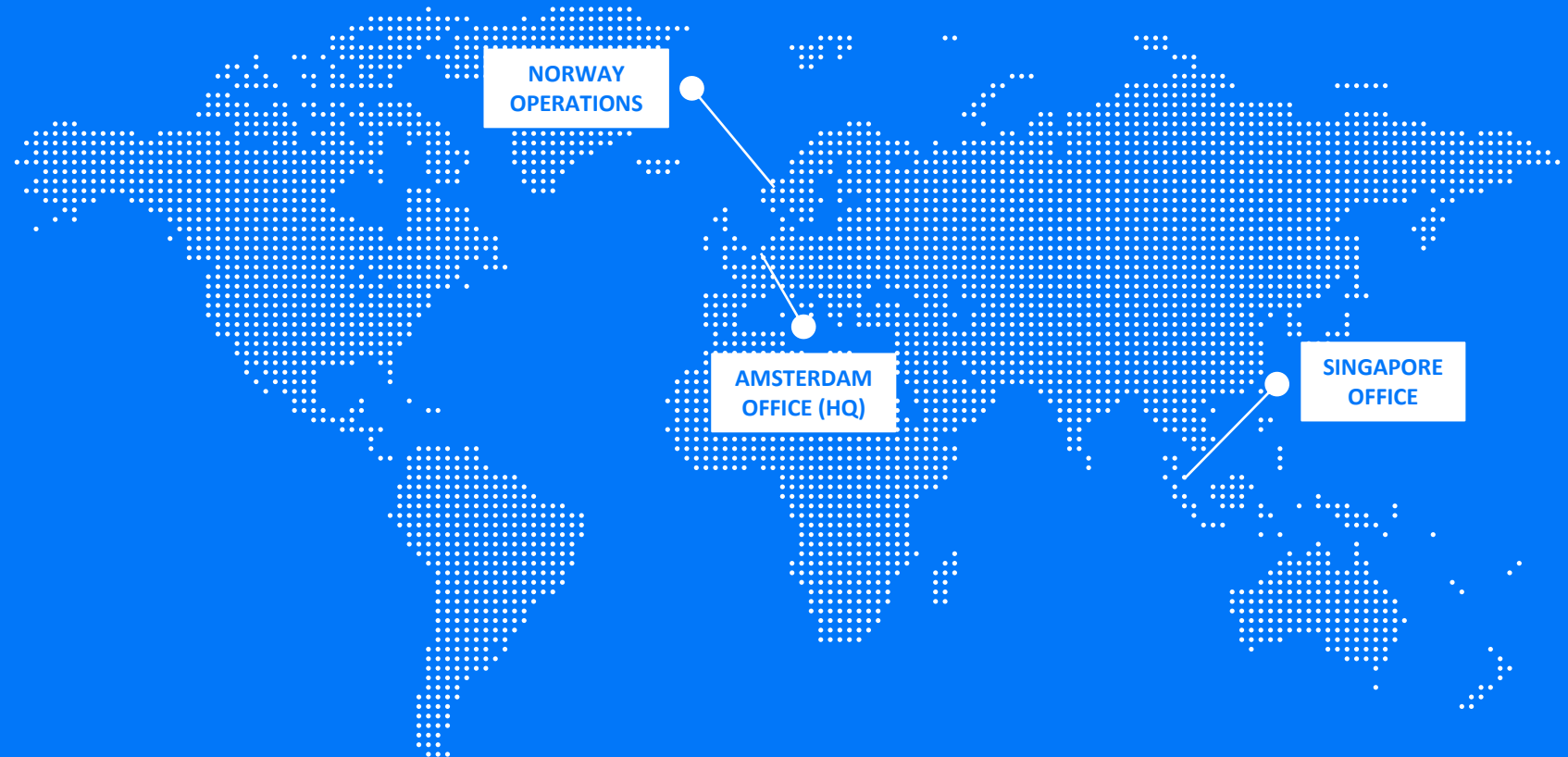


GOODFUELS COMPANY HISTORY

COMPANY HIGHLIGHTS

- 2015: Founding year
- 2015: First HVO delivery
- 2018: First BFO delivery
- 2022: Partnered with FinCo
- 2020: Norway operations
- 2021: > 100 bunkers
- 2022: Singapore Office

And maybe
soon the
US?



OUR MISSION

Accelerating the energy transition by offering truly impactful sustainable solutions...



.... By co-developing and commercialising truly sustainable alternatives for fossil fuels

GoodFuels develops and offers renewable fuels for heavy transport owners

Renewable solutions / alternatives



... By empowering cargo owners to switch to sustainable fuel and together change industry

GoodShipping offers a fuel switch impact service for cargo owners

Decarbonisation service / carbon insetting





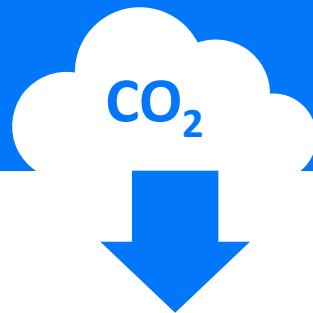
HOW TO FULFIL THIS MISSION?



GOODFUELS AMBITION

CHALLENGE

Our clients facing a growing demand for defossilization in shipping (regulatory and voluntary) and are looking for the best solution for the foreseeable future



SOLUTION

We develop fuels and fuel blends in-house and together with our close partners. We test these fuels on their operational performance and when required adapt the fuel based on any potential specific customer requirement through for example upgrading or additives

We are the most experienced player in the market, sharing our technical expertise along the client's journey

RESULT





Have a real impact in the industry

Seen as a sustainable frontrunner

Show this to their clients which leads to having a competitive advantage



CURRENT MARINE PRODUCT OFFERING

	Petroleum-derived fuels	Renewable Fuel alternatives	Renewable fuel fraction	0,5% sulfur compliant	0,1% sulfur compliant	Product availability	HFO installation?	LOCAL emission reduction
	Residuals (HFO/ LSFO)	Bio-residual fuel Biofuel Oil	100%	Yes	Yes	+	Yes	+/-
		MDF1-100 Bio-distillate fuel	100%	Yes	Yes	+++	Yes	+/-
		MDF1-blends with fossil fuel oil (HSFO)	blends	No	No	+++	Yes	+/-
		MDF1-blends with fossil fuel oil (VLSFO)	blends	Yes	No	+++	Yes	+/-
		MDF1-blends with fossil gas oil (MGO)	blends	Yes	Yes	+++	Yes/ no	+/-
	Distillates (MGO)	MD1-100 Bio-distillate fuel Hydrotreated Vegetable Oil	100%	Yes	Yes	++	No	++
		MD1-blends with fossil gas oil (MGO)	Blends	Yes	Yes	++	No	+



OUR SUSTAINABILITY BOARD

GoodFuels has a wonderful corporate goal: to get rid of fossil fuels. We are proud to partner with game-changers such as GoodFuels

– Barbara Bramble, former (retired) sustainability board member, National Wildlife Conservation and former founder/ chairman of RSB

Sustainability board



**ANNE MARIT
POST-MELBYE**
Head of industry policy
Miljøstiftelsen ZERO



**MARTIN
JUNGINGER**
Full Professor
Bio-Based Economy
Utrecht University



**PATRICIA
OSSEWEIJER**
Professor of Sustainability
TU Delft

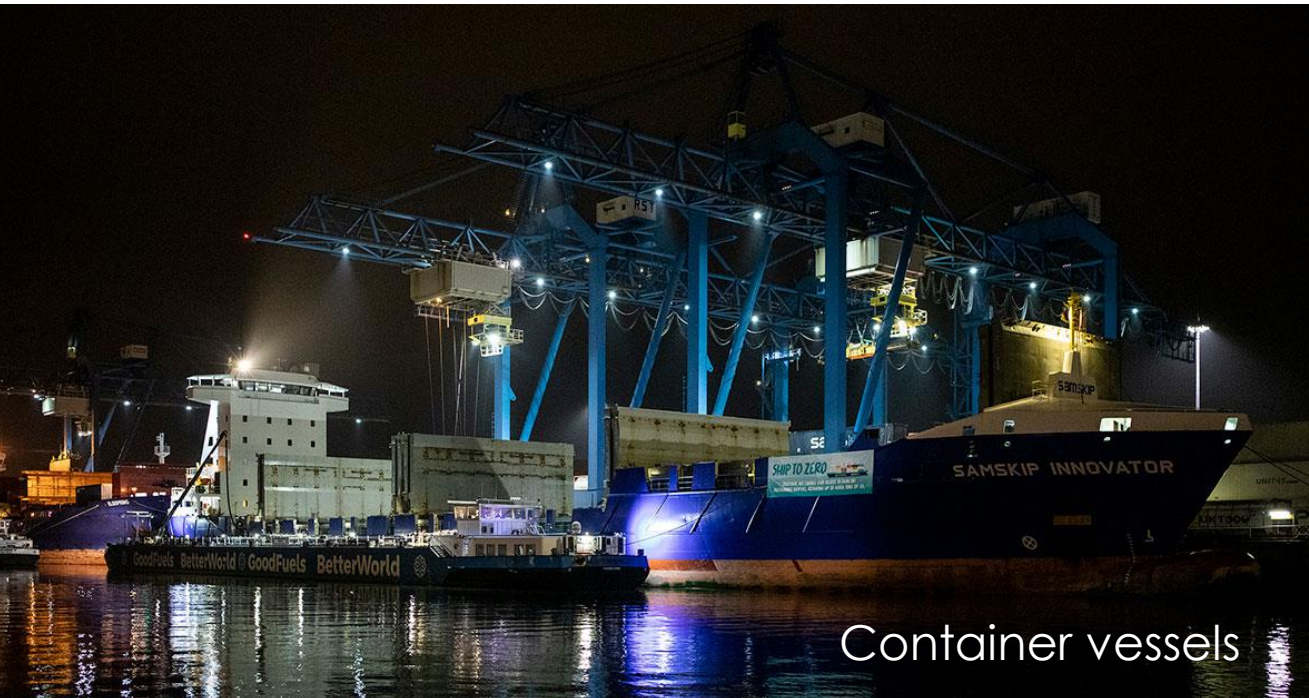


**LET'S
MAKE
WAVES**



GOODFUELS CLIENTS

Customers that opt out of the fossil default and choose GoodFuels' sustainable biofuels.



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Bulk Carriers and General Cargo



Dredging and Near-shore



OLDENDORFF



subsea 7



Ministerie van Defensie



Koninklijke Marine

BHP



NORDEN



**THE MOST
EXPERIENCED
PLAYER IN THE
MARKET**



Fuel Laboratories

- Global collaboration with **well established** fuel labs
- **Mutual understanding** on biofuels
- Development of **new test methods**
- Critical feedback on current testing practices



Engine testing

- Development of **drop-in** fuels
- Engine performance testing
 - Combustion behaviour
 - Power output
 - Emission performance (NO_x, PM)
 - Corrosion



Engine and fuel system makers

Engine makers

- Collaboration on fuel requirements
- Support to end customers
- Engine testing of new fuels
- Advising ISO committee on fuel standard



Fuel system makers

- Trouble shooting currently used system
- Development of new fuel system components



Classification societies

- Continuous collaboration with classification societies
- GoodFuels provides expert input and measurements data



**ANY
CHALLENGES?!**



CHALLENGES FOR SCALING

ECONOMIC

Biofuels are still **more expensive** than fossil fuels.

TECHNICAL

There is a **lack of fuel standards** for marine biofuels. This has influence on:

- Insurance
- NOx emissions
- Carbon reporting
- Engine maker acceptance

REGULATORY

The shipping sector is behind with industry wide **defossilization targets**.

Only the **Netherlands** has a system to incentivise marine biofuels.

Operational and safety regulations are more strict for biofuels than fossil fuels

Sustainability is closely linked to regulations and might differ dependent on the geographical location.



SOLUTION FOR SCALING: The European example of biodiesel in shipping

Combining REGULATORY & ECONOMIC

Based on an EU Renewable Energy Directive, the **Netherlands** has implemented a system to incentivise marine biofuel.

In the Netherlands, marine biofuel is **price competitive** with fossil fuel.

An **increasing volume of marine biofuel** is supplied at Dutch ports.

The EU has recently proposed a comprehensive **package of climate change legislation** ('Fit for 55'), including:

- FuelEU Maritime
- EU Emissions Trading System
- EU Renewable Energy Directive

Fit for 55 will further drive the upscaling of marine biodiesel.





THANK YOU!

