

16 September 2020

Moving Fuel Forward

Michael Fiedler-Panajotopoulos

Director of Government Affairs - Europe



RENEWABLE ENERGY GROUP



REG - Pioneer to Powerhouse

1995

West Central Cooperative makes 1st investment in Soybean oil refinement in Ralston, IA by purchasing a water degumming process

2003

West Central forms Renewable Energy Group (REG) LLC to build biodiesel plants for investors

2012

REG becomes publicly traded as REGI on NASDAQ

Present

REG at Svebio 2020!

2002

Builds 35.5 KT continuous flow biodiesel plant – largest in USA at the time

2006

REG Inc. announces \$100 million private equity and partnership investment. Begins construction of two new biodiesel plants.

2017

REG acquires Petrotec AG and sets up European HQ in Amsterdam



Global Production And Distribution

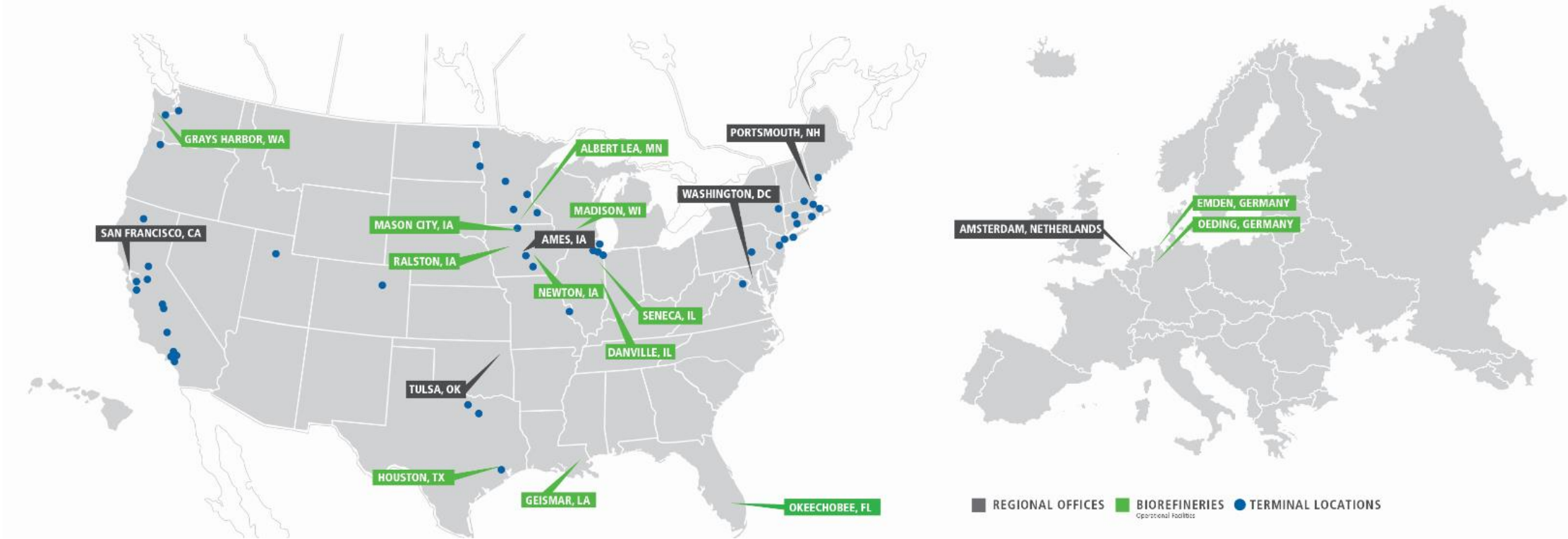
45+
TERMINALS

13
BIOREFINERIES

49
PRODUCTS DELIVERED TO: U.S STATES

6
CANADIAN PROVINCES

10
EU COUNTRIES



REG – Moving **FUEL FORWARD**



REG enables a cleaner world!

- Over 18 million tons of GHG reduction to date¹
- Investing in commercial scale tests of biofuels in new non-road transport applications



Strong proponent of reliable sustainability and overall compliance

- Support of EWABA Standard of Transparency
- REG presides over EWABA and chairs ISCC Technical Committee for Wastes



Backed by mainstream financial institutions citing long-term value creation²

- Blackrock Inc., DNB Asset Management AS, JP Morgan Investment Management, Vanguard among investors in REG

1. REG Analysis

2. <https://www.nasdaq.com/symbol/regi/ownership-summary>

Biodiesel and Renewable Diesel Markets

Transportation & Fleets



- Over 18 MMT of GHG Reductions to date
- Supporting fleets and municipalities with blended fuels

Marine



- Cleaner Marine Fuels
- Partnering with shipping companies to reduce GHG emissions with marine biofuel solutions

Home Heating & Power Generation

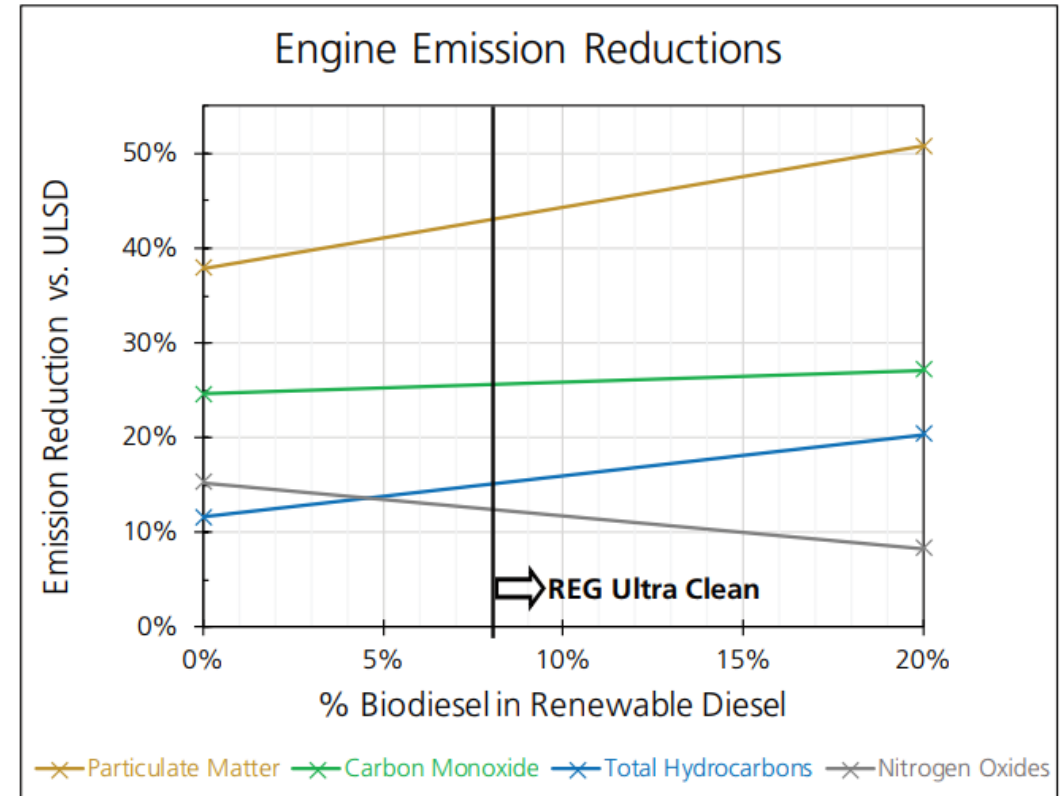


- Same Heat, Fewer emissions
- Environmental and economic value for customers



REG Ultra Clean[®] Diesel

- Renewable Diesel demand outpacing supply
- REG Ultra Clean^{™1} is a patent pending renewable fuel that:
 - Gives dual benefit of Biodiesel and Renewable Diesel
 - Ensures sustainability mandates are met with stable supply and cost benefits
- Compared to petroleum diesel, REG Ultra Clean[™] reduces:
 - Total Hydrocarbon by >15%
 - Carbon Monoxide by >25%
 - Particulate Matter by >40%
 - Nitrogen Oxides by up to 12%



REG Renewable Fuels for The Nordics

- REG Renewable Diesel
- REG Ultra Clean[®] Diesel
- REG Biodiesel
 - Feedstock specific: UCOME, RME, CME
 - CFPP specific: 0°C, -5°C, -10°C, -13°C
- Bio Heating Oil
- Renewable Marine Fuel
- REG Glycerin



Future Fuel Choices Must Be Smarter

Biodiesel



Renewable Diesel



Economics, market needs and benefits of different solutions could influence biofuel choices and destination of waste feedstocks such as UCO

Regulations Should Look Beyond CI Score of Primary Product When Incentivizing Fuel Markets

➤ REG's analysis indicates:

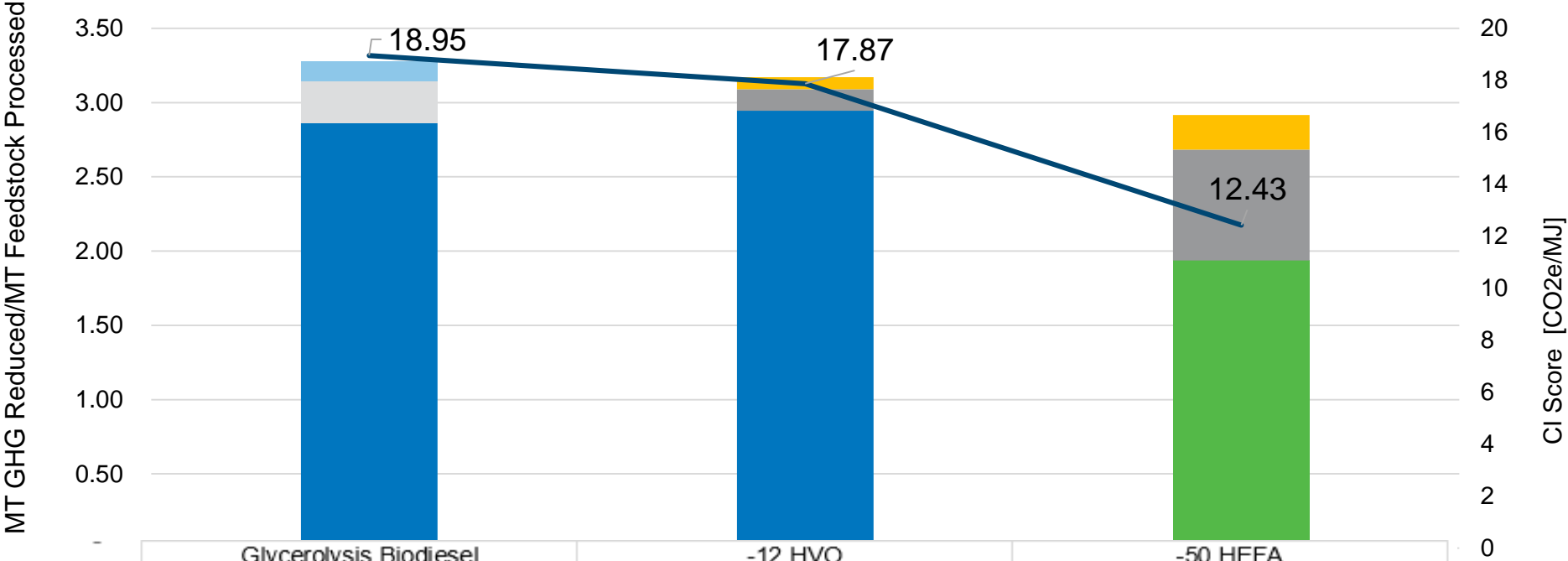
- A high-yield biodiesel plant provides greatest total GHG emissions reductions per unit of waste lipid feedstock
- HEFA-SPK production provides lower total GHG emissions reductions due to:
 - Low yield for the primary product
 - Significant cracking of carbon chains
 - Lower fossil baseline

Analysis Overview

- Life Cycle Assessment was conducted for three fuel pathways
 - Waste UCO biodiesel plant
 - Waste UCO HVO facility producing primarily HVO (i.e., Renewable diesel)
 - Waste UCO HVO facility producing primarily HEFA-SPK (i.e., Renewable jet fuel)
- Carbon intensity and total emission reductions were estimated
 - California's GREET model and emission factors were utilized
 - Carbon intensity for each material calculated as gCO₂e/MJ
 - Each renewable product displaced its respective petroleum counterpart
 - Total Emissions, or '*resource efficiency*' was calculated as total MT CO₂e reduced per MT of feedstock processed

Carbon Intensity & Resource Efficiency

Primary Product CI Score vs. Resource Efficiency for UCO Feedstock



	Glycerolysis Biodiesel	-12 HVO	-50 HEFA
Petroleum Glycerin Displacement	0.13	-	-
Residual Fuel Oil Displacement	0.28	-	-
LPG Displacement	-	0.08	0.23
Gasoline Displacement	-	0.14	0.75
Jet Displacement	-	-	1.94
Diesel Displacement	2.86	2.95	-
Total (MT GHG Reduced/ MT Feedstock)	3.27	3.17	2.92



Results

- Between 2017-2019 the EU consumed 8,380,000 MT of UCO¹
- Table 1 below shows reductions if all UCO used in fuel production went to either biodiesel or HEFA-SPK
- If all UCO would have gone to HEFA-SPK, far *less* CO₂e would have been reduced

Table 1: Emission Reduction Potential of UCO (MT CO ₂ e)	
HEFA Emission Reduction	24,439,598.78
Biodiesel Emissions Reduction	27,466,218.87
Difference	(3,026,620.08)

Conclusion

- Waste lipids, by definition, have a limited annual supply
 - *Feedstock Efficiency*: New metric idea that could be used to compare overall GHG reduction impact of fuel production processes
 - MT of CO₂e Reduced per MT of Feedstock Processed
- Regulatory programs should look beyond “CI Score” of primary product when incentivizing fuel markets

- High-yield biodiesel plant provides greatest total GHG emissions reductions per unit of waste lipid feedstock
- HEFA-SPK provides lower reductions due to:
 - Low yield for the primary product
 - Significant cracking of carbon chains
 - Lower fossil baseline

Thank you!

Michael Fiedler-Panajotopoulos

Director of Government Affairs - Europe

mp@regi.com

Sales:

Erik Bråfelt | erik.brafelt@regi.com

Tel. +31(0) 20 757 6826 | Mob. +31 (0)6 39 69 64 67