1. GLOBAL DEMAND DRIVERS FOR RENEWABLE DIESEL PRODUCTION

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Each producer site case study includes: Start Up Date, Location, Status, Production Capacity, Feedstocks, Technology Partners, Expansion Plans

4.1 DENMARK
Neste (Rotterdam, RD/SAF, 345mgy or 1.15 million MT, 2021 Expansion to 2 million MT)

4.2 FINLAND
Neste (Finland, RD/SAF, 270mgy or 440k MT, 2021 Expansion)
UPM BioVerno (RD/SAF, 35mgy or 100k MT, Feedstock: tall Crude Oil, Lappeenranta, 2021: operating)
UPM (Kotka, RD/SAF, 137mgy or 300k MT, Feedstock: Tall Crude Oil, 2021: planning for 2025 production)
ST.1 Finland (RD/SAF, 55mgy or 200k MT, waste oils, 2021: operating)

4.3 ITALY
ENI Venice (165mgy or 350k MT, RD/SAF w UOP tech, 2021 expanding to 600k MT)
ENI Sicily (Gela Plant Expansion, RD/SAF w UOP tech, 206mgy or 600k MT, 2021 operating)

4.4 FRANCE
Total LaMede (RD/SAF, 150mgy or 500k MT, waste and plant oils, La Mede, 2021 operating)
Total Grandpuits (RD/SAF/Naptha, 93mgy or 400k MT, waste and plant oils, Paris/Seine, 2021 announced)
4.5 SWEDEN
Preem Gothenburg (RD, 250mgy, FOGs, 2021 Operating)
Preem, Sunpine (Gothenburg, HTopsoe, 16,000bpd)
Preem Setra (RD, 8mgy, Woody Biomass, 2021 Construction)

4.6 NETHERLANDS
Empyro Hengelo (5mgy, RD/SAF, Upgraded Pyrolysis Oils, Hengelo, Neth, Operating 2021)
SkyNRG (28mgy, SAF, Amsterdam, Netherlands, 2021 planning)

4.7 UNITED KINGDOM
Philips 66 Humber (RD/SAF, 46mgy, Humber, England, 2024 expansion to 80mgy)

4.7 SPAIN
Repsol (2021: under construction, 2023: opening at 250MT, 2030: expansion to 600MT)
Cepsa

4.9 PORTUGAL
Galp

4.10 POLAND
PKN Orlen (300k MT/yr, 2021: under construction, 2025: plans to open)

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6.2 REG Geismar (75mgy operating 2021, Louisiana, US, 2021 Expansion to 340mgy)
6.3 World Energy (RD/SAF, operating, w expansion to 360mgy in 2022, Los Angeles, US)
6.4 Emerald Biofuels (w UOP Tech, 110mgy, Port Arthur, Texas, US, 2021 planning)
6.5 Kern Oil and Refining (California, USA)
6.6 BP Cherry Point (RD/SAF from waste FOG, 42mgy, Birch Bay, Washington, op in 2021)
6.7 Ryze Renewables Las Vegas (RD/SAF, 168mgy, Las Vegas, Nevada, 2021 planning)
6.8 Ryze Renewables Reno (RD/SAF, 168mgy, Las Vegas, Nevada, 2021 planning)
6.9 NEXT Renewable Fuels (RD/SAF, 765mgy, Port of Columbia, Oregon, 2021 planning)
6.10 Marathon (RD/SAF, 183 million gallons/yr, Dickinson, North Dakota, 2021 conversion)
6.11 Holly Frontier Cheyenne (RD, 200 million gallons/yr, Cheyenne, Wyoming, 2021 conversion)
6.12 Global Clean Energy - Exxon (125mgy, 7500 to 15,000 bpd, Bakersfield, California, 2021 conversion)
6.13 Philips 66 Rodeo (RD/SAF, 800mgy, Rodeo, California w Worley, 2021 planning)
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6.18 East Kansas Agri-Energy (RD, 5mg, DCO oil, NexTech/Saola tech, Garnett, Kansas, 2021 operating)
6.19 Aemetis Carbon Zero 1 Project (RD/SAF/RNG/CCS, 45mgy, Riverbank, California, 2021 construction)
6.20 Gevo: Net Zero 1 (RD/SAF/RNG/Feed, 45mgy, California, est. 4Q 2021)
6.22 Heartwell Renewables (Love's-Musket-Trillium/Cargill, Tallow, 80mgy, Nebraska)
6.23 Gron Fuels (w/Koch, 900 million gallons/year, Port Charles in Baton-Rouge, Louisiana, 2021 planning)
6.24 Calumet (Great Falls Refinery (10 to 12,000bpd, Great Falls, Montana est 2022)

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RENEWABLE DIESEL PRODUCERS AND CASE STUDIES
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6.3.6 Ensyn Ontario (3mgy, Renewable Crude and Diesel from Pyrolysis, 2021 operating)
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6.4 SOUTH AMERICA

6.4.1 PARAGUAY
Omega Green (RD/SAF, 400mgy, BSBios/Paraguay, $800million est, 2024 Startup)

6.4.3 BOLIVIA
Government/Bolivian Fiscal Oil Fields(YPFB) Partnership,
Guillermo Elder Bell refinery ($250million, 9,000bpd or 3 million barrels/yr)

6.4 ASIA

6.4.1 SINGAPORE
Neste (RD/SAF, 2020: 675 mgy or 1.3 million MT/yr, 2025 expansion to 2.7 million MT/yr)

6.4.2 INDONESIA
Pertamina Plaju refinery (RD/SAF w UOP, 307 mgy or 20,000bpd, plant oils, 2023 startup)
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- Examples of Use in Renewable Diesel and SAF Production

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REG Geismar, Louisiana
World Energy, Los Angeles,
Emerald Biofuels Port Arthur, Texas
Kern Oil and Refining California,
BP Cherry Point, Birch Bay, Washington
Ryze Renewables Las Vegas
Ryze Renewables Reno
NEXT Renewable Fuels
Marathon, Dickinson, North Dakota
Holly Frontier, Cheyenne, Wyoming
Global Clean Energy - Exxon California,
Philips 66, Rodeo, California
Wyoming Renewable Diesel
CVR Energé, Wynnewood, Oklahoma
St Joseph Renewable Fuels Illinois
Diamond Green Diesel, Port Arthur Texas
East Kansas Agri-Energy, Garnett, Kansas
Aemetis Carbon Zero 1 Project, California
Gevo: Net Zero 1, California
Seabord Energy, Hugoton, Kansas
Heartwell Renewables, Nebraska
Gron Fuels, Baton Rouge, Louisiana
Calumet Great Falls Refinery, Montana

Neste, Rotterdam, Netherlands
Neste, Finland
UPM BioVerno, Finland
UPM Kotka, Finland
ST.1 Finland
ENI Venice, Italy
ENI Sicily, Italy
Total LaMede, France
Total Grandpuits, France
Preem Gothenburg, Sweden
Preem, Sunpine, Sweden
Preem Setra, Sweden
Empyro Hengelo, Netherlands
SkyNRG, Amsterdam, Netherlands
Phillips 66 Humber, UK
Repsol, Spain
Cepsa, Spain
Galp, Portugal
PKN Orlen, Portugal
Covenant Energy, Saskatchewan, Canada
Tidewater, British Columbia, Canada
Cielo Alberta, Canada
Ensyn Ontario, Canada
Ensyn Cote Du Nord Quebec, Canada
Omega Green, Paraguay
Bolivian Fiscal Oil Fields(YFPB) Partnership
Neste, Singapore
Pertamina Plaju, Indonesia
Cilacap Refinery, Indonesia
Total, China
Eco Biochemical, China
Hunanyu, China
Changyou Bioenergy, China
Yangzhou Jianyuan, China

SUSTAINABLE AVIATION PRODUCER STUDIES
World Energy, SkyNRG, Red Rock Biofuels, Gevo, Velocys,
Lanzatech, Fulcrum, Neste Air, Byogy, Vertimass

FEEDSTOCKS IN RENEWABLE DIESEL & SAF PRODUCTION
1st Gen: Soybean, Rapeseed, Palm, Canola, Sunflower
Circular Feedstocks: Used Cooking Oil,
Yellow Grease, Poultry Fat, Beef Tallow, White Grease,
Brown Grease, Trap Grease, Distiller’s Corn Oil
Circular, Rotational Crops: Carinata, Pennycress
Energy Crops: Tall Oils, Pongamia, Castor, Tobacco
Oils, Hemp, Winter Oilseeds, Jatropha
Circular Feedstocks from Ag Waste and Residues:
Bagasse, Corn Stover, Rice Husks, Almond and Nut Shells
Circular Feedstocks from Wood and Forestry Residues,
Sawmill Residues and Sawdust, Municipal Solid Waste
Aquatic Oils: Algae, Seaweed, Halophytes, Salicornia

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