

ANTICIPATED U.S. ETHANOL OPPORTUNITIES IN EMERGING GLOBAL ETJ SAF MARKETS

The U.S. Grains Council anticipates the U.S. and Japan will be thriving markets in the near-term for corn ethanol-to-jet (ETJ).

Considering current production announcements and ETJ production capacity, approximately **2.25 billion gallons of ethanol will be needed for SAF by 2030.**



UNITED STATES

PRODUCTION ANNOUNCEMENTS BY PRODUCERS

	Start Year	ETJ in million gals/yr	Ethanol in million gals/yr
ADM-Gevo	2025-26	500	900
Gevo Net-Zero 1	2026	55	99
LanzaJet-Marquis	2023	120	216
Blue Blade Energy	2028	135	243
Summit Agriculture	2025	250	450



JAPAN

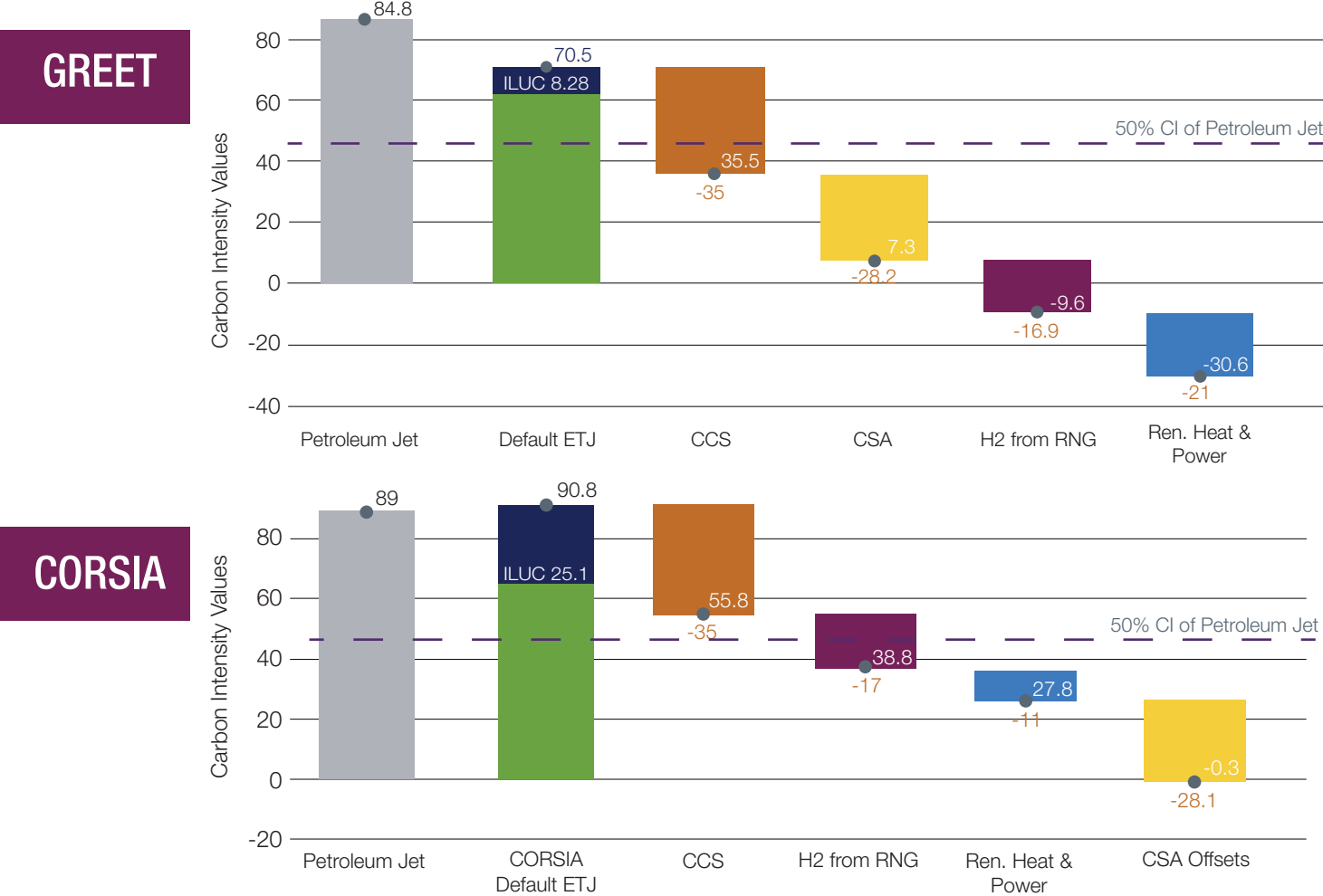
PRODUCTION ANNOUNCEMENTS BY PRODUCERS

	Start Year	ETJ in million gals/yr	Ethanol in million gals/yr
Idemitsu - Project 1	2026	26	48
Idemitsu - Project 2	2030	106	190
Cosmo Oil & Mitsui & Co.	2027	58	105

*Ethanol volume is assumed based on 1.8:1 ethanol to ETJ conversion

Carbon Intensity Reduction Potential of U.S. Corn Ethanol in Jet Fuel

Under the DOE GREET Model and the ICAO CORSIA Model



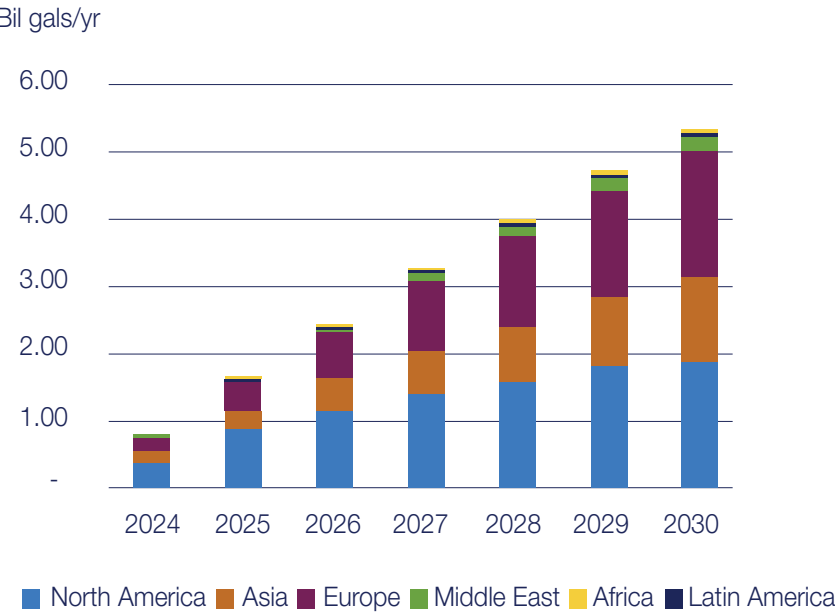
*Charts for illustration purposes only. | Default EJT in GREET chart uses standalone configuration with corn oil extraction. | CCS = carbon capture and sequestration. CCS technology is not currently recognized by CORSIA; the figure in the CORSIA chart assumes a hypothetical scenario where CCS is accepted in the policy. | CSA = climate smart agriculture. The figure of CSA Offsets in the CORSIA chart shows indirect CI reduction through carbon offsets from regenerative agricultural practices assuming same inputs in GREET.

Global Demand for SAF Expected to be Driven by Government Policies, Incentives in U.S., EU, Airline Commitments & Government Targets in Asia

	Policy Type	Blending Target		Demand Drivers
		2030	2050	
UNITED STATES	Incentives	10%*	100%*	-U.S. government seeking 3 billion gallons of domestic SAF production by 2030, increasing to 35 billion by 2050 under its ‘SAF Grand Challenge.’ The Inflation Reduction Act (IRA) provides a SAF blending production credit through 2027.
	Production target	3 bil/gals	35 bil/gals	
EUROPE	Mandate	6%	70%	-U.K. targets up to 10% SAF by 2030 and up to 75% by 2050. Crop-based biofuels supplied to aviation sector are not eligible for counting to targets.
JAPAN	Target/mandate**	10%	-	-Target of 10% aviation fuel by 2030. Expect to mandate it by March 2024.
REST OF WORLD	Initiatives	-	-	-Airlines providing momentum with government targets emerging. -India: Plan to mandate the use of 1% of SAF for domestic airlines by 2025. -Brazil: Target 1% emission reduction through SAF from 2027, reaching a 10% reduction by 2037. -South Korea: Plan to adopt SAF by 2026. -Singapore: Create Sustainable Air Hub Blueprint to set concrete production targets and pathways.
GLOBAL AIRLINES	Initiatives	10%	-	-Major global airlines target at least 10% SAF by 2030 and have signed offtake agreements to invest in SAF technologies and secure future supply.
IATA	Initiatives	SAF's contribution to achieve targeted CO2 reduction: 5% 65%		-IATA's Net Zero strategy for 2050: at least 6 million tonnes SAF production; reduce 8,164 MT CO2 by 2050, 65% from SAF, 13% non-dropin fuel, 11% CCUS, 8% offsets, 3% improvements above BAU.
ICAO	Initiatives	-	-	-Long-term global aspirational goal (LTAG) of net-zero carbon emissions by 2050 and Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)

*Estimates based on production and projected total consumption
**Plan to mandate by March 2024

Global SAF Demand Projection By Region



Source: S&P Global Commodity Insights, August 2023. Data subject to change later.

About IATA, ICAO & CORSIA

The International Air Transport Association (IATA) is the trade association for the world's airlines, representing some 300 airlines or 83% of total air traffic. IATA supports many areas of aviation activity and help formulate industry policy on critical aviation issues.

The International Civil Aviation Organization (ICAO) is a United Nations agency that oversees international civil aviation, setting global standards for safety, security, and environmental sustainability.

The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) is an ICAO initiative designed to reduce and offset greenhouse gas emissions from international flights, aiming for carbon-neutral growth in the industry from 2020 onward through market-based measures and reporting requirements.

About DOE GREET

The Greenhouse gases, Regulated Emissions, and Energy use in Technologies (GREET) model is a publicly available life-cycle analysis tool for consistently examining life-cycle energy and environmental effects of a wide range of technologies in transportation, power, and material products. Developed by DOE's Argonne National Laboratory, it takes a holistic approach to model energy and environmental effects over the entire supply chain of a technology with process-level granularity.