

TCBiomass | August 26, 2026

A Take-Off into US and Global SAF Policy



Jim Spaeth

Co-Founder & Managing Director | Aerovida Bio

AEROVIDA BIO - Who We Are

Five principals who have run the plants, signed the offtakes and carried the P&L



Jim Spaeth

20 years at the DOE Bioenergy Technologies Office, running national SAF technology development. Chaired IEA Bioenergy and the Biofuture Clean Energy Ministerial. Former Boeing.



Gene Cotten

Operations and technology executive across HEFA and ATJ. President, NXTClean Fuels. Honeywell UOP. Led Valero refinery operations and multi-billion-dollar capital projects.



Dan Kim

Former COO, Crysalis (ATJ) and CSO, NXTClean (HEFA). Built fuel platforms at Pilot Flying J (Berkshire). Former CFO, World Energy. ExxonMobil and Morgan Stanley.



Carrie Song

SVP, Neste Global Renewable Products, a \$9B P&L. Former Sales Director, BP Americas and APAC. GM, Cummins power generation. London School of Economics.



Lance Baird

35 years in hydrocarbon process engineering. Principal Engineer at Honeywell UOP. 21 patents and 16 published applications. Operations manager for 60+ pilot plants.

SAF Producers

NESTE



SAF Developers

NXTCLEAN
FUELS



Fuel Suppliers



Technology/EPC

Honeywell
UOP



Government & Policy



Our Capabilities – Integration & Offerings

Operating Experience, Relationships & Precedents

Pipeline Assessment & Acceleration

800+ projects tracked globally

- Assess risks and ways to mitigate to accelerate
- Map feedstock availability to project viability by region
- Investment-grade FEL analysis at every stage

Technology Readiness & De-Risking

30+ yrs process & SAF operating experience

- 12-discipline FEL-stage technical readiness scoring
- Technology vetting, benchmarking & validation
- Close readiness gaps before capital is committed

Workstream Assessment

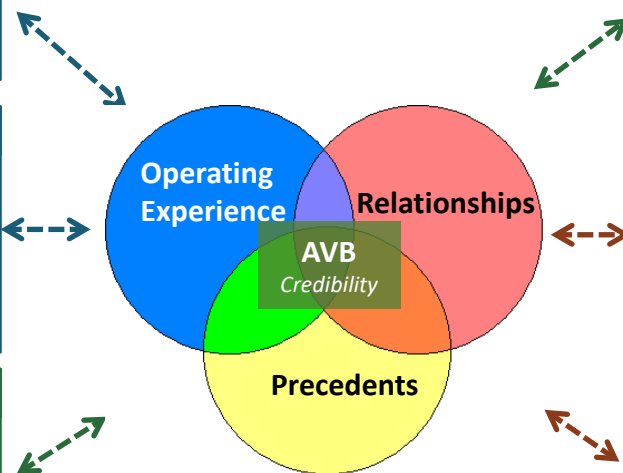
FEL-stage scoring - objective, not qualitative

- Score each of 7+ workstreams & details at each stage
- Identify gaps & prioritize acceleration actions
- Stakeholder risk assessment overlay

■ Assessment & De-Risking

■ Project Analysis Framework

■ Commercial/Feedstock & Financing/Policy



Technical Readiness

Engineering deliverables aligned with FID req.

- Process, Mechanical, Piping, Civil, Elect., Inst, HSE...
- HAZID, HAZOP, LOPA, SIL, fire protection
- Constructability, procurement, operations,...

Commercial & Feedstock

Bankable frameworks with aligned risk sharing

- Offtake structuring with “escrow” model
- Risk adjusted credit monetization
- Feedstock economics & lower supply costs

Financing & Policy

Close non-feedstock cost gaps (2–4x+)

- Refinery-quality CAPEX/OPEX by pathway and scale
- Supply curve across pathways – “Solomon Study”
- Equitable allocation of risks and value

US Country Profile

SAF policy, commercial plant status

Federal - Section 45Z Clean Fuel Production Credit (1)

Credit Availability

- To clean transportation fuel produced in the U.S. and sold from January 1, 2025 through Dec. 31, 2029

Regulatory Status

- Treasury and IRS issued proposed regulations in February 2026, updated in May and June 2026
- Rules implement changes from the **One Big Beautiful Bill (OBBB)**, including:
 - The SAF \$1.00/gallon credit no longer exists.
 - Restricting feedstocks to U.S./Mexico/Canada.
 - Indirect land-use change (ILUC) emissions are excluded.
 - Negative emissions rates are prohibited except for fuels derived from animal manure

45ZCF-GREET

- The model calculates life-cycle GHG emissions for each fuel pathway to determine the credit value under §45Z.
- It is pathway-specific, feedstock-specific, and designed solely for 45Z compliance.

Provisional Emissions Rate (PER) Process Formalized

- If a fuel type isn't listed in Treasury's annual emissions table:
 - Producers must request an Emissions Value Request (EVR) from DOE.
 - DOE issues an emissions value letter.
 - Producers then submit a PER request to Treasury

Federal - Section 45Z Clean Fuel Production Credit (2)

What This Means for Producers

- 45Z credit value is directly tied to the **life-cycle emissions rate** calculated by 45ZCF-GREET. Even small changes in:
 - electricity sourcing, hydrogen production, feedstock origin, process energy
- can shift the CI score enough to materially change the credit value

Ethanol (Corn & Cellulosic)

- Removal of ILUC significantly improves CI scores.
- More granular modeling inputs allow optimized plant-specific CI reductions.

Renewable Diesel & SAF

- SAF loses its special 45Z rate, but modeling is now more consistent.
- Hydrogen sourcing becomes a major CI driver.

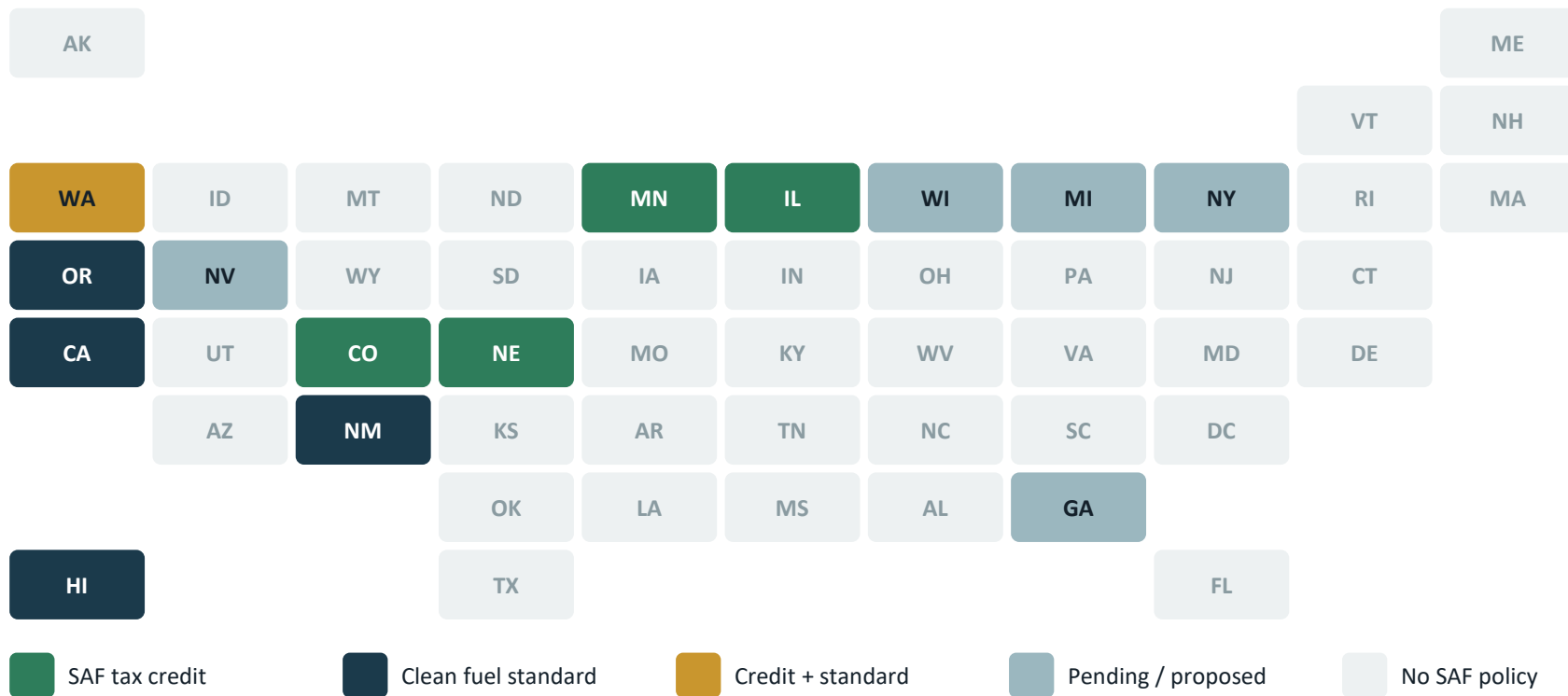
RNG

- Manure-based RNG retains negative CI potential.
- Landfill gas and other RNG pathways face tighter modeling rules

Hydrogen Producers

- Must use 45Z hydrogen pathways, not 45V.
- CCS options can materially reduce CI.

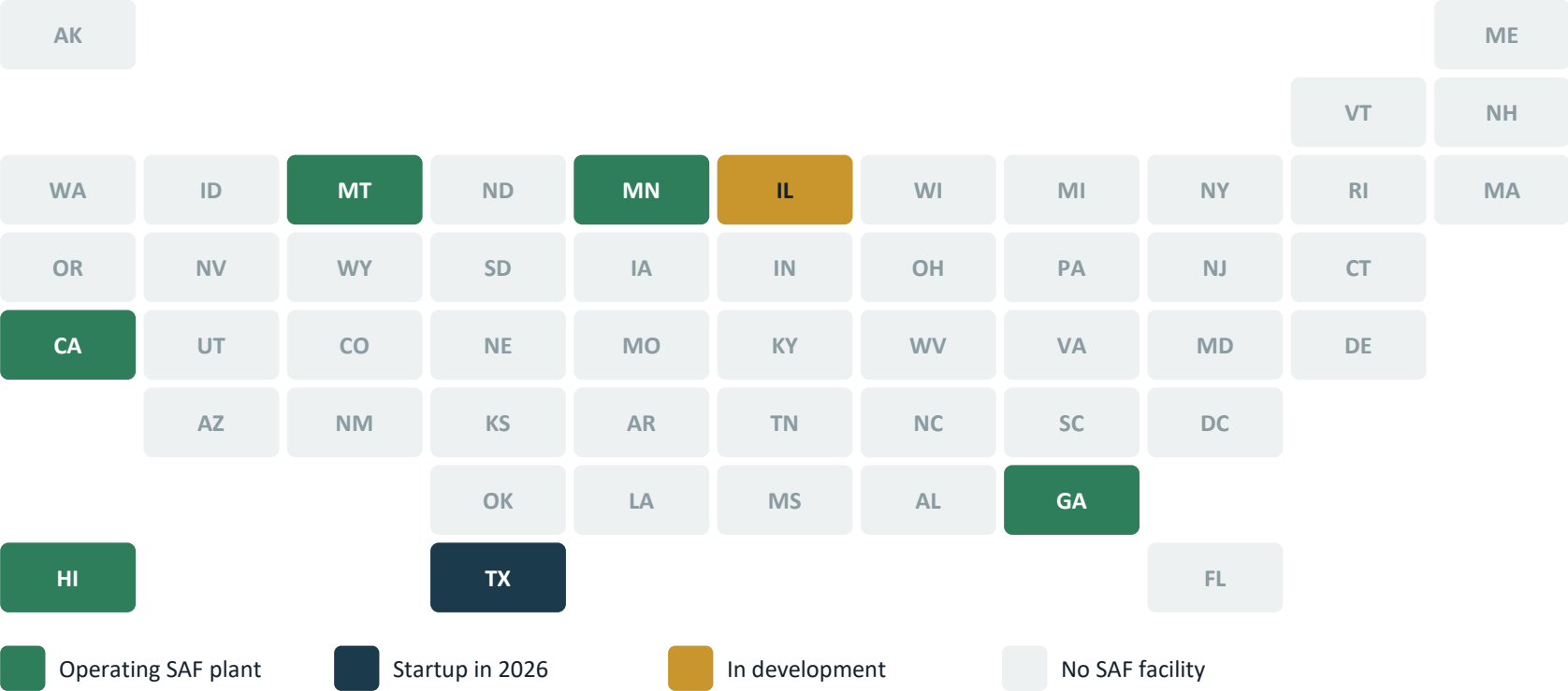
State SAF Policy Map – Credits vs. Clean Fuel Standards



State SAF Policies – 2026 Updates

STATE	ACTION	VALUE	STATUS	KEY NOTES
MN	SF 1312 – credit expanded	\$1.50/gal + supplemental	Advancing, 2026 session	Supplemental credit effective TY2025; larger annual allocations from TY2026. Winter cover crop feedstocks a focus.
CA	Governor's 2026-27 budget trailer bill	\$1.00/gal, +\$0.02/gal per 1% CI cut below 50%	Proposed	Credit against fuel excise tax; est. \$165M/yr rising to \$300M. LAO recommends against on cost-effectiveness.
CO	HB 26-1289 signed Jun 3, 2026	≥\$1.50/gal, +1¢ per 1% CI cut above 50%	Enacted, effective Jan 1, 2027	Purchase-side credit capped \$3M/yr through 2032; repeals prior SAF facility construction credit.
WA	Cascadia Sustainable Aviation Accelerator	\$20M state investment	Launched Jan 2026	Pairs with SB 5447 credit (up to \$2.00/gal once production starts) and streamlined permitting.
NM	Clean Transportation Fuel Program	LCFS-style credit value	Rules adopted Jan 2026; in force Apr 1, 2026	Fourth state clean fuel standard after CA, OR, WA. Opens a new book-and-claim credit market.
HI	SB 2999 clean fuel standard signed Jul 16, 2026	CI reduction: 10% by 2035, 50% by 2045	Enacted; rules due Jan 1, 2028	Diesel and gasoline phase begins 2029. Separate SAF tax credit bill (SB 2027) died in committee.
MI / NE / NY	Producer and blender credit bills	\$0.75–\$2.00/gal	Mixed	MI SB 235/236 passed Senate, House pending. NE LB 937 (\$0.75/gal) in effect. NY S1229 (\$1.25–\$1.50/gal) in committee.

U.S. SAF Production Facility Map



U.S. SAF Production Facilities – Status by State

LOCATION	FACILITY / OPERATOR	PATHWAY	CAPACITY	STATUS
California	Rodeo Renewed — Phillips 66	HEFA	~800 MGY renewable fuels; SAF share ramping	Operating; conversion complete
California	Paramount — World Energy	HEFA	340 MGY expansion target	Not operating; expansion on hold
Texas	Port Arthur — Diamond Green Diesel	HEFA	235 MGY SAF within 470 MGY plant	SAF unit complete; startup 2026
Hawaii	Kapolei — Par Pacific	HEFA	61 MGY renewable fuels including SAF	Commercial operations began April 2026
Montana	Great Falls — Montana Renewables	HEFA	70M gal SAF supply pact with World Energy	Operating; expansion underway
Georgia	Freedom Pines — LanzaJet	Alcohol-to-jet	10 MGY	Operating; first ethanol-to-jet plant
Illinois / Minnesota	Marquis–LanzaJet; MN SAF Hub	ATJ; blending & logistics	Up to 120 MGY (IL)	IL in development; MSP hub open

Regional Profiles

SAF policy, commercial plant status

Global SAF Policies – Europe & North America

JURISDICTION	POLICY	TARGET / TRAJECTORY	STATUS	KEY NOTES
UK	SAF Mandate (RTFO)	2% 2025 → 10% 2030 → 22% 2040	In force Jan 2025	Buy-out £4.70/L caps value. SAF Bill adds Revenue Certainty Mechanism. HEFA cap falls to 35% by 2040.
EU	ReFuelEU Aviation Reg. 2023/2405	2% 2025 → 6% 2030 → 20% 2035 → 70% 2050	In force Jan 2025	e-SAF sub-quota 1.2% (2030) to 35% (2050). Airlines must uplift ≥90% of fuel at EU airports.
Canada	SAF Blueprint (Jul 2026)	10% SAF use by 2030 (~1B litres)	Strategy – no federal mandate	Identifies SAF as strategic opportunity; industry pressing for durable demand policy.
Canada – BC	Low Carbon Fuel Standard	Jet CI requirement + volumetric renewable jet requirement	Enacted, jet volume rule from 2028	Only binding jet-fuel requirement in Canada; provincial model for other markets.

Global SAF Policies – Asia-Pacific

JURISDICTION	POLICY	TARGET / TRAJECTORY	STATUS	KEY NOTES
China	Green aviation planning + SAF uplift pilots	Scaling pilot uplift; no binding blend mandate to date	Pilot phase, expanding airports	State-led capacity build; large UCO feedstock base increasingly directed to domestic SAF.
Japan	MLIT Basic Policy + Energy Supply Structure Act	10% of Japanese airline jet fuel by 2030 (~1.7M kL)	Dual obligation set	Refiners ≥ 100 k kL must supply SAF equal to 5% of 2019 jet GHG. SAF production tax credit available.
South Korea	SAF Blending Mandate Roadmap (MOLIT / MOTIE)	1% 2027 $\rightarrow$ 3–5% 2030 $\rightarrow$ 7–10% 2035	Announced Sep 2025	International departures. Penalty up to 150% of SAF price $\times$ shortfall; route-rights rewards for over-compliance.
Singapore	SAF Levy, Sustainable Air Hub Blueprint	1% uplift 2027 $\rightarrow$ 3–5% by 2030	Levy applies from Oct 2026	Fixed cost-envelope levy funds centralized purchase of SAF and environmental attributes.

Global SAF Policies – South Asia, Oceania & Latin America

JURISDICTION	POLICY	TARGET / TRAJECTORY	STATUS	KEY NOTES
India	ATF Control Order amendment + national SAF policy	1% 2027 → 2% 2028 → 5% 2030	Mandate expected Jan 2027	Targets gazetted Apr 2026. Demand ~62 kt (2027) to ~380 kt (2030); IOCL and BPCL building UCO capacity.
Australia	Cleaner Fuels Program (ARENA) + Budget demand measure	No blend mandate; demand measure in design	Supply-side support active	A\$1.1B production-linked incentives over 10 years, plus Guarantee of Origin and feedstock strategy.
Brazil	ProBioQAV (Fuel of the Future Law)	1% GHG reduction 2027 → 10% 2037	Decree published Aug 2026	Emissions-based, not volumetric. Book-and-claim allowed; ANP/ANAC rules due Dec 2026. ATJ/ethanol advantaged.
Colombia	Aerocivil SAF Roadmap (Res. 00090 of 2025)	100M gal/yr by 2035; 450M gal/yr by 2050	Roadmap adopted Jan 2025	Production targets rather than a blend mandate; co-processing and ethanol feedstocks are lead pathways.

SAF Production Facilities – Europe & the Americas

LOCATION	FACILITY / OPERATOR	PATHWAY	CAPACITY	STATUS
United Kingdom	Teesside — Lighthouse Green Fuels	Waste-to-jet (FT)	180M litres/yr	In planning; ~GBP 2bn project
Netherlands	Rotterdam — Neste Delfzijl - SkyNRG DSL-01	HEFA HEFA	Up to 500k t/yr SAF 100k t/yr SAF plus 35k t/yr by-products	Operating Construction started May 2026
Canada	Come By Chance, NL — Braya	HEFA	18,000 bpd renewable fuels	Operating; SAF capability planned
Brazil	Bahia — Acelen Renewables	HEFA (macauba)	20k bpd renewable fuels	Financing closed; construction starting
Colombia	Cartagena — Ecopetrol	e-SAF (power-to-liquid)	~800 t/yr	Pilot development with German partners

SAF Production Facilities – Asia-Pacific

LOCATION	FACILITY / OPERATOR	PATHWAY	CAPACITY	STATUS
Singapore	Tuas — Neste	HEFA	Up to 1 Mt/yr SAF	Operating; largest single site
China	Zhangjiagang — EcoCeres	HEFA	350k t/yr	Operating; second site under LOI
Japan	Wakayama — ENEOS	HEFA	~400,000 kL/yr	Startup targeted FY2026-27
India	Panipat — Indian Oil	UCO-HEFA; ATJ planned	35k t/yr; ATJ up to 860k t/yr	Operating; first CORSIA-certified
Australia	Townsville, QLD — Jet Zero Australia	Alcohol-to-jet	102M L SAF + 11M L renewable diesel	FEED complete; FID targeted 2026

Global SAF Capacity – Operating vs. Announced

REGION	OPERATING CAPACITY	ANNOUNCED / IN CONSTRUCTION	PRIMARY POLICY DRIVER	TAKEAWAY
North America	~1.3 Mt/yr (HEFA-led)	~4-5 Mt/yr by 2030	45Z clean fuel credit + state SAF credits	Largest near-term operating base
Europe	~0.5 Mt/yr	~3 Mt/yr by 2030	ReFuelEU 6% and UK mandate	Mandate-driven demand pull
Asia-Pacific	~1.2 Mt/yr	~3 Mt/yr by 2030	Japan/Korea 2030 targets; export supply	Singapore and China anchor exports
Latin America	under 0.1 Mt/yr	~1 Mt/yr by 2030	Brazil ProBioQAV; Colombia e-SAF	Feedstock advantage, early build-out
Global total	~3 Mt/yr, roughly 1-2% of jet fuel	12+ Mt/yr announced	Mandates plus production credits	Announced pipeline is 4x today's output

China

China – SAF Policy, Plants & Government

SAF POLICY	• No binding blend mandate to date; Civil Aviation Administration of China (CAAC) has prioritized building the SAF ecosystem and voluntary demand. • NDRC and CAAC launched a national SAF pilot programme in Sept 2024, expanding through 2025–26 to more airports and carriers. • 14th Five-Year Plan set a 50,000 t SAF consumption target; fuel must meet CAAC standards. • Large domestic UCO base increasingly redirected from export to domestic SAF production.
COMMERCIAL PLANTS	• Zhangjiagang — EcoCeres: 350k t/yr HEFA, operating; second site under LOI. • SINOPEC / TotalEnergies joint SAF unit: 230k t/yr planned, using SINOPEC's SRJET technology. • Project Spark (Mar 2026): first fully commercial closed-loop SAF chain — EcoCeres fuel, CNAF blending, flights from Chengdu Shuangliu.
KEY GOVERNMENT PARTICIPANTS	• CAAC — standards, pilots and the CAAC SAF Center (COO Eason Chen). • National Development and Reform Commission (NDRC) — co-launched the SAF pilot programme. • CASRI (CAAC Second Research Institute) — certification and carbon-tracking framework. • China National Aviation Fuel Group (CNAF) — state blending and distribution channel.

China SAF Production Sites

- HEFA is the dominant pathway for current SAF production.
- Sustainability Certification of SAF- AnchorTrace platform

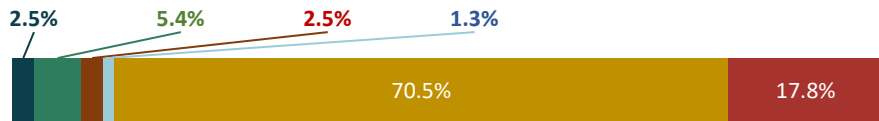


Market Take-Aways

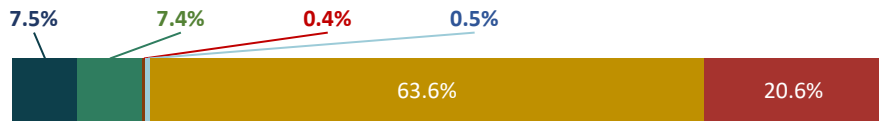
Market Overview: ~800 projects, ~5% operating, ~5% advancing

Credible cost leadership and EPC/O&M plans will drive top quartile positioning

By project count



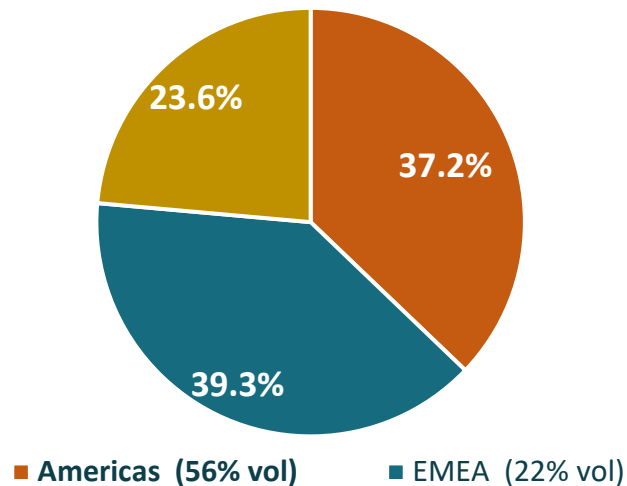
By gross volume — 25.0 bn gal/yr



~80% of projects are unlikely to proceed

Operating and committed projects run ~3x and ~1.5x average size

By region — % of projects (% of volume)



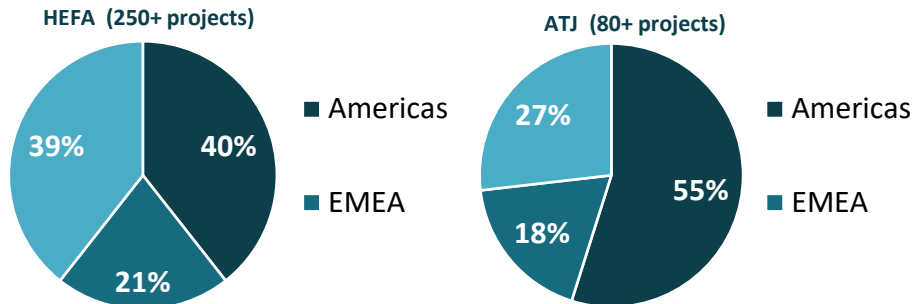
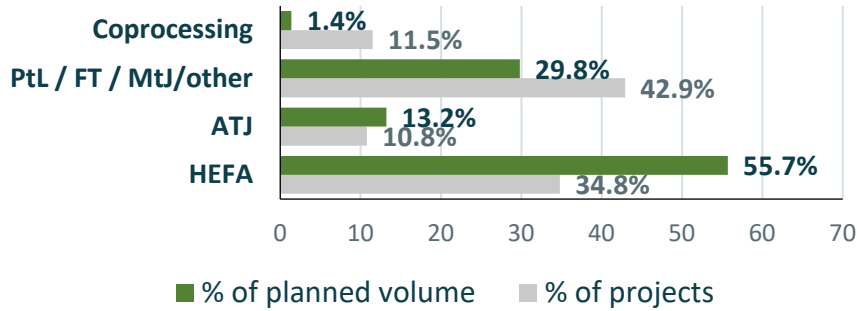
EMEA has more projects than the Americas

56% of the volume sits in the Americas

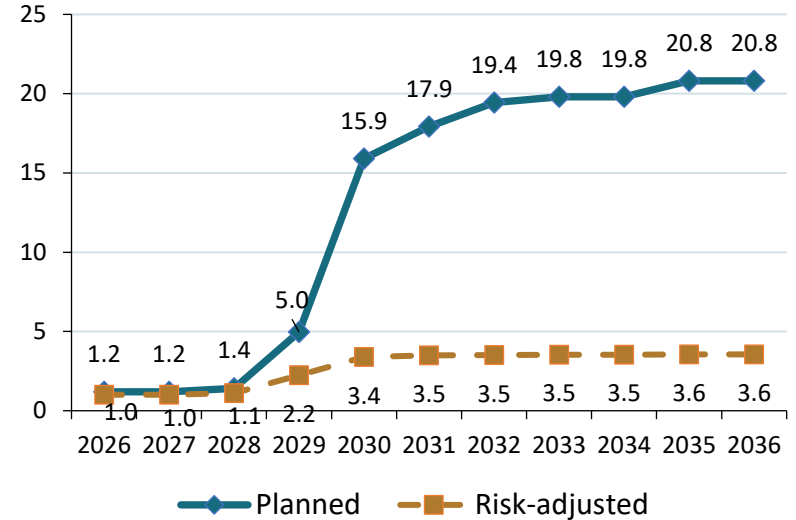
Market Overview: Pathways and the Realization Gap

82% of planned volume not likely to arrive...HEFA and ATJ lead in economics and scale

PROJECT COUNT VS. PLANNED VOLUME BY PATHWAY



POTENTIAL VS. RISK-ADJUSTED SAF CAPACITY (BN GAL/YR)



Risk-adjusted supply applies a stage- and sponsor-weighted screen.

Jim Spaeth

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