Virent BioForm® SAK: Enabling 100% Drop-In SAF

CAAFI®
COMMERCIAL AVIATION ALTERNATIVE FUELS INITIATIVE

Brice Dally
2022 CAAFI Biennial General Meeting
Washington DC
Parade of US SAF Commercialization Session
June 2, 2022

VIRENT | MARATHON Marathon Petroleum Corporation

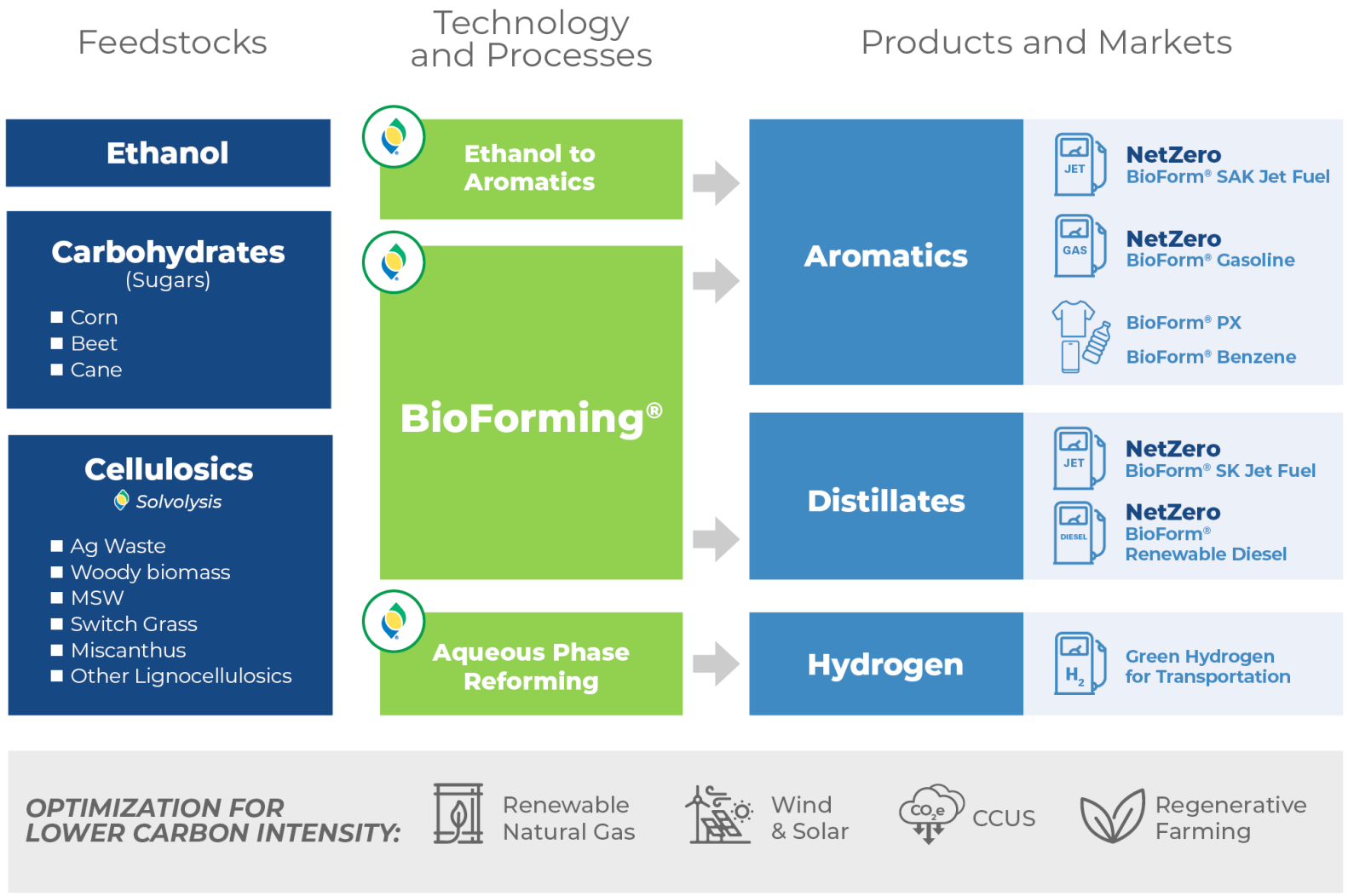
Virent Forward Looking Statements

This Presentation includes forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Such statements may relate to, among other things: our leadership in catalytic conversion; the future of compliance obligations in fuels; consumer preferences and demand in chemicals and fuels; our ability to implement our operational plans; branding effects, including “halo” effects; our ability to manage risks related to new technology, scale-up and regulatory incentives; feedstock prices and supply chain efficiencies; compliance costs and competition; our access to capital; and the contributions from and benefits to members of the Consortium, among others.

We have used words like “anticipate”, “believe”, “could”, “estimate”, “expect”, “intend”, “may”, “plan”, “predict”, “project”, “should”, “will” to identify forward-looking statements in this presentation. Although we believe the assumptions upon which these forward-looking statements are based are reasonable, any of these assumptions could prove to be inaccurate and the forward-looking statements based on these assumptions could be incorrect. Our operations and anticipated transactions involve risks and uncertainties, many of which are outside our control, and any one of which, or a combination of which, could materially affect our results of operations and whether the forward-looking statements ultimately prove to be correct. Actual results and trends in the future may differ materially from those suggested or implied by the forward-looking statements depending on a variety of factors which are described in greater detail in filings with the SEC by Marathon Petroleum Corp., of which Virent is a wholly-owned subsidiary. All future written and oral forward-looking statements attributable to us or persons acting on our behalf are expressly qualified in their entirety by the previous statements. We undertake no obligation to update any information contained herein or to publicly release the results of any revisions to any forward-looking statements that may be made to reflect events or circumstances that occur, or that we become aware of, after the date of this presentation.

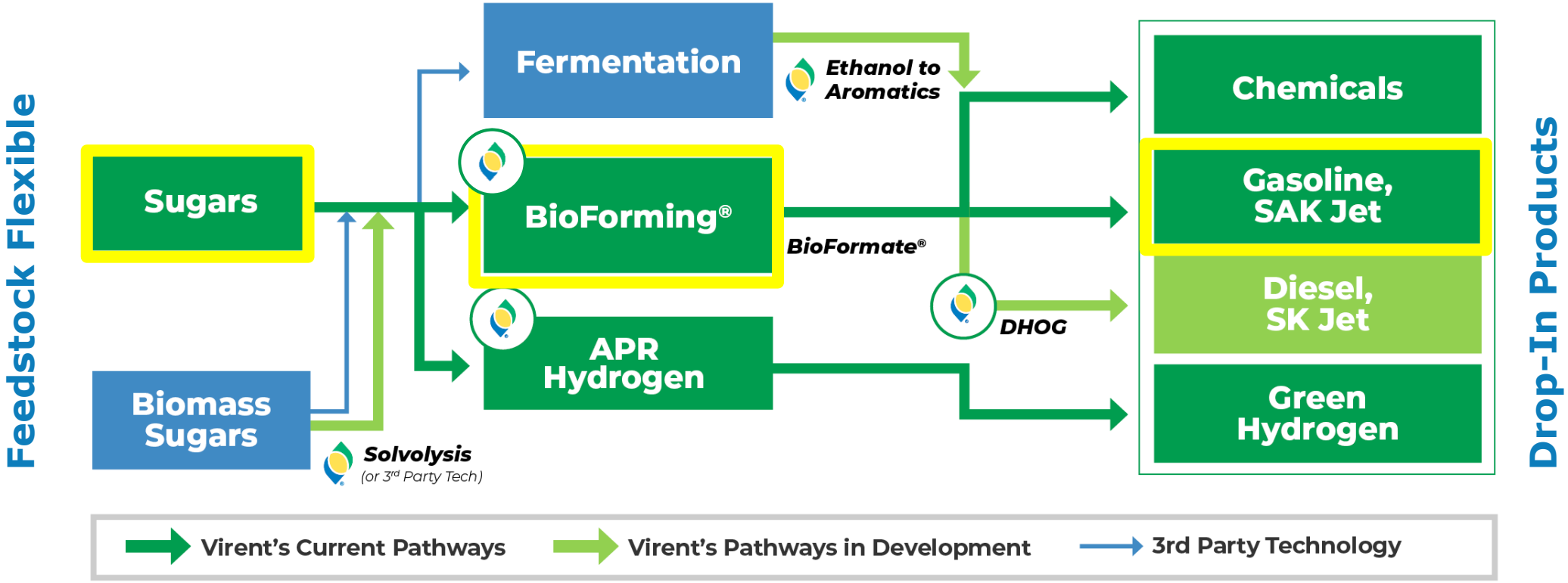
Developing Opportunities for Renewable Markets

- **Headquartered in Madison, WI**
- **Founded in 2002 on APR Hydrogen**
- **Acquired by Tesoro in 2016 and now a wholly owned subsidiary of Marathon as of 2018**
- **Commercial focus is on scale-up and first plant deployment**
  - Virent, Marathon and Johnson Matthey (JM) working together to explore options for a first plant project to produce biofuels from corn sugars
  - The same platform produces bio-paraxylene, a key raw material for production of bio-polyester
- **Also progressing next-generation technologies for further growth opportunities**



The Virent Business Platform

Providing a pioneering technology platform to lead the energy evolution

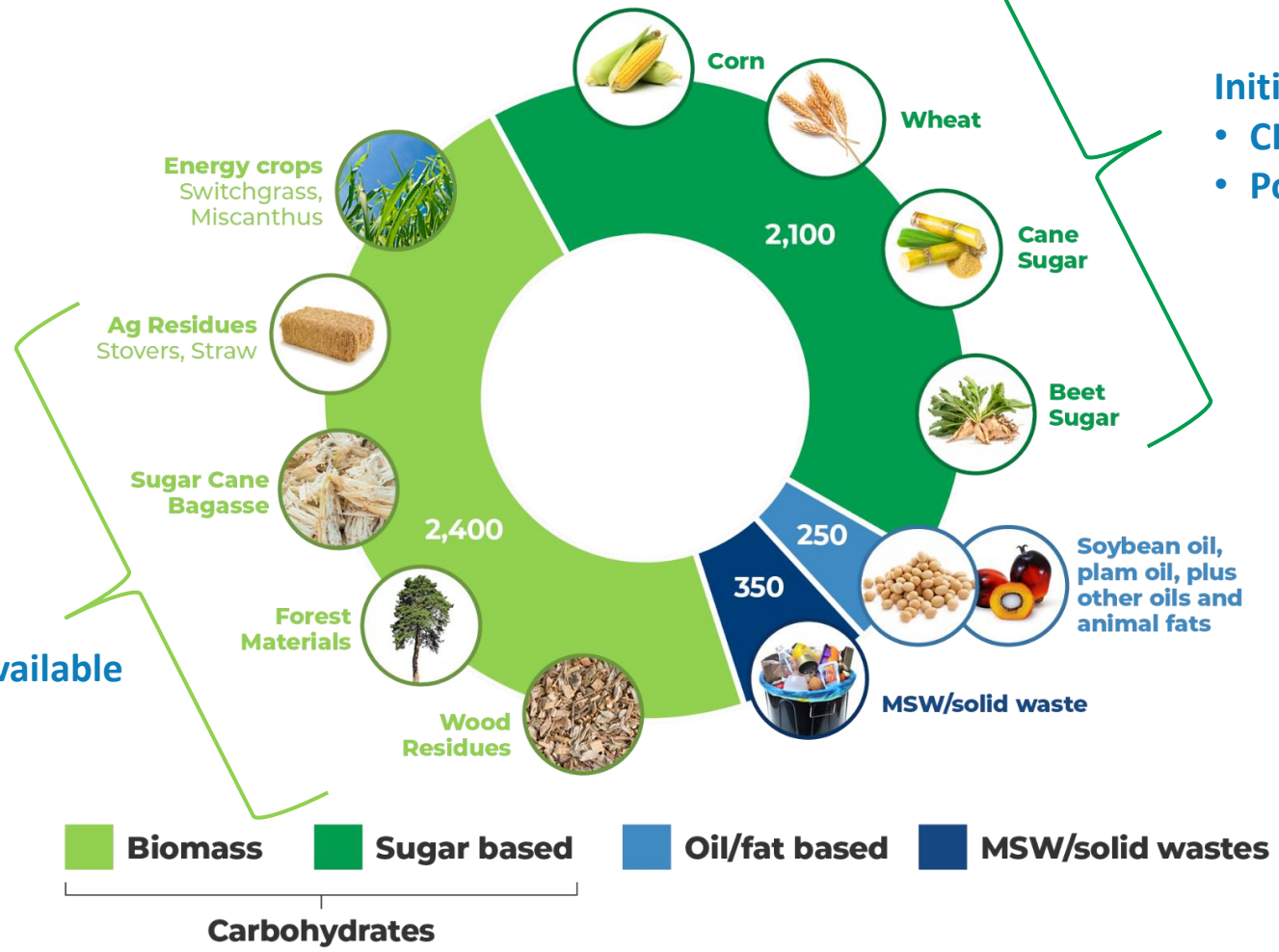


A scalable bio-based catalytic technology to reduce the carbon footprint of everyday fuels and chemicals

A Carbohydrate Conversion Technology

Feedstock is readily available and provides opportunities for growth toward lower carbon sources without limiting access

Initial Deployments
- **CI Reduction >50%**
- **Potential for *Net Zero***



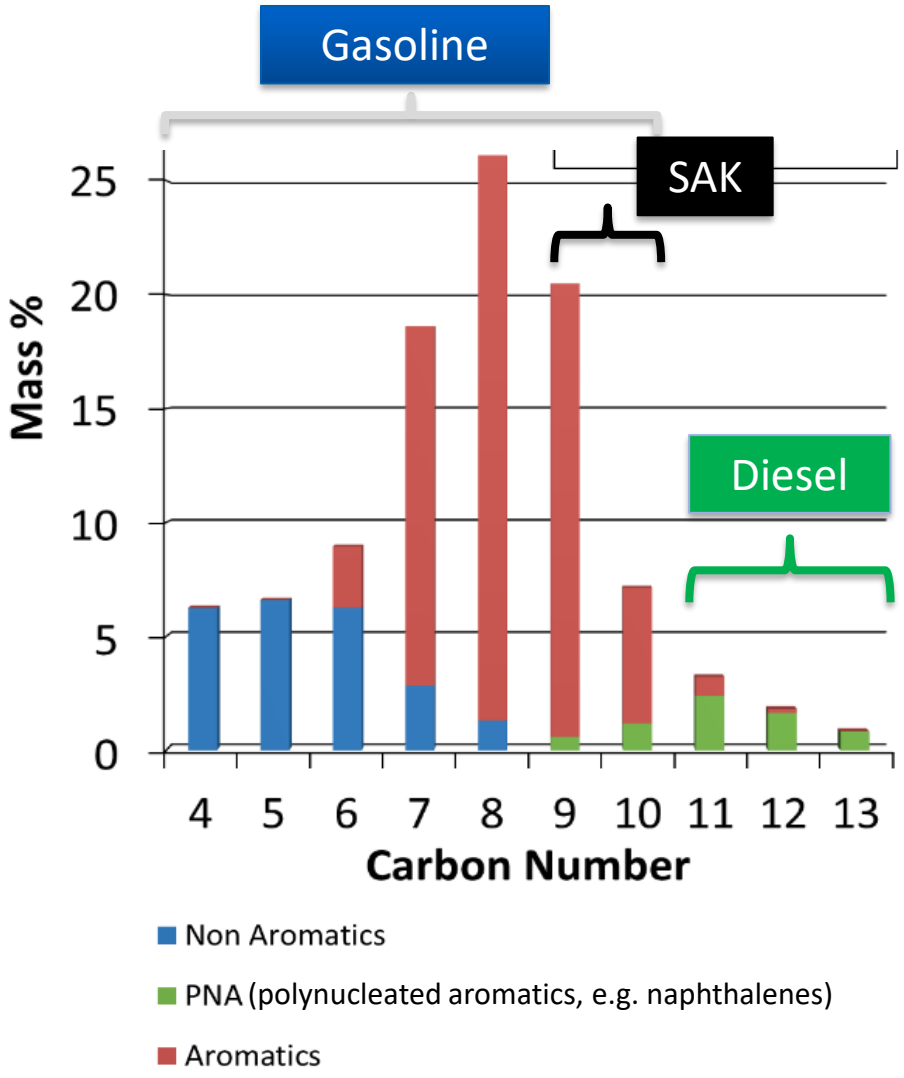
Future Deployments
Once Commercially Available

** Above numbers are In million tonne units and derived from the following data sets:*

1. *USDA Foreign Agricultural Service. (2021) Production, Supply, and Distribution Database. Foreign Agricultural Service, Department of Agriculture. https://data.nal.usda.gov/dataset/production-supply-and-distribution-database. Accessed 2021-11-11.*
2. *U.S. Department of Energy. (2016) 2016 Billion-Ton Report. M.H. Langholtz, B.J. Stokes, and L. M. Eaton (Leads), ORNL/TM-2016/160. ORNL, Oak Ridge, TN. 448p. Doi: 10.2171/1271651*

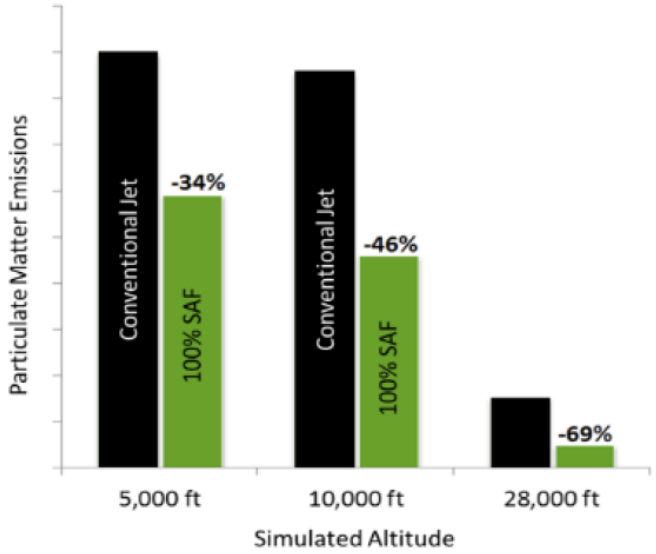
BioForm® SAK is the SAF Cut from BioFormate

Fuel engineered to have low PM emissions – **No naphthalenes**



High density, low freeze pt SAK + low density, high freeze pt HEFA

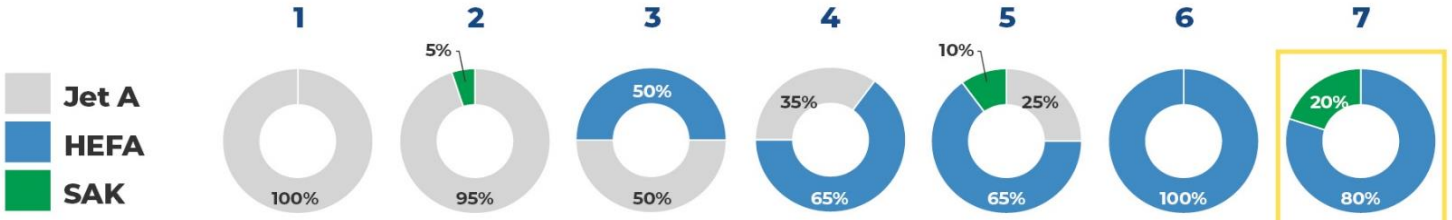
Test	Units	D1655 Limit	HEFA	SAK	20% SAK + HEFA
Aromatics	Vol %	8 – 25	0	98	20
Naphthalenes	Vol %	< 3	0	0	0
Density	kg/m3	775 – 840	750	875	775
Freeze Point	°C	< -40	< -40	< -77	<< -40



30-70% PM reductions using 100% SAF (SAK/HEFA blend)

BioForm® SAK + SPK = 100% Drop-In SAF

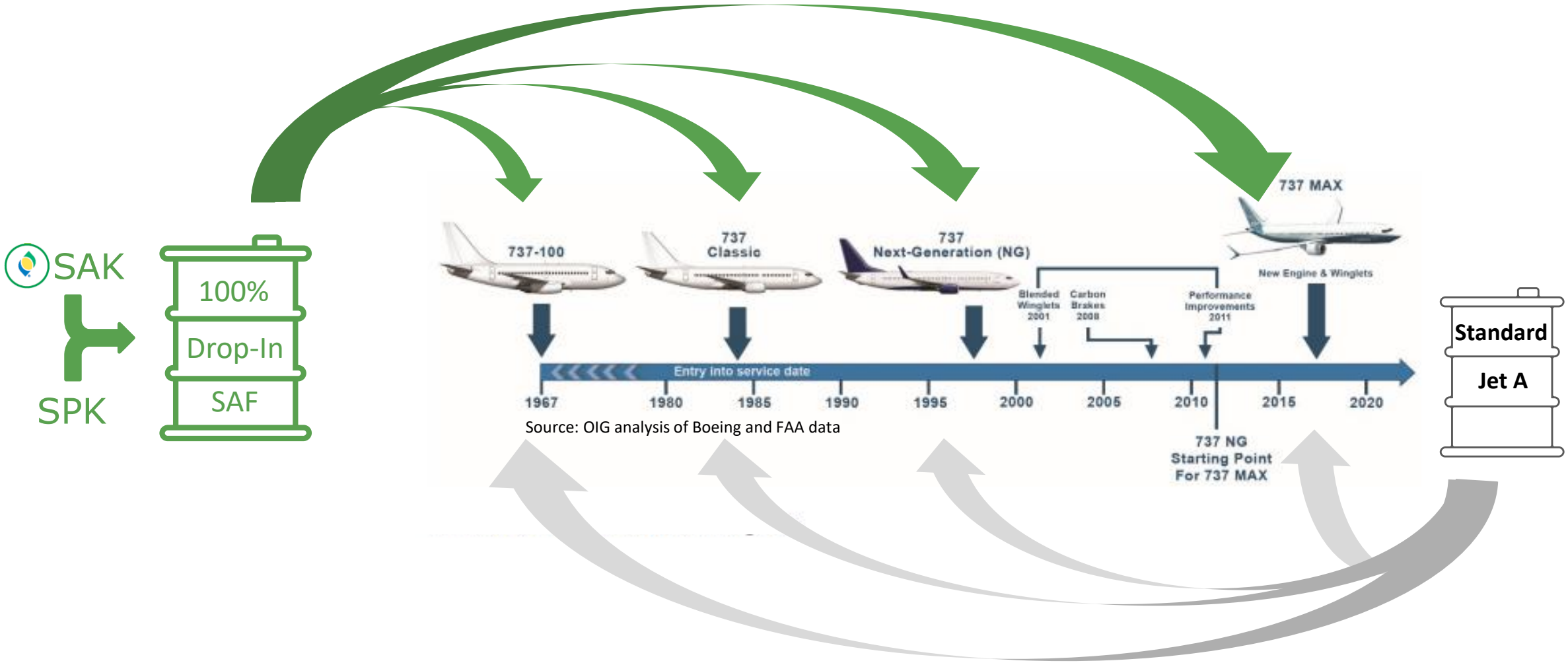
Illustrative example with HEFA can extend to FT-SPK, ATJ-SPK, etc.



	1	2	3	4	5	6	7
Drop In?	✓	✓	✓		✓		✓
Lower PM?			✓	✓	✓	✓	✓ 35-70% reduction
100% SAF?						✓	✓
Comments		Enabled by SAK Annex	Enabled by HEFA Annex	HEFA density limits blending level	SAK allows higher HEFA blending	Not drop-in	Unique 100% drop-in SAF option

100% Drop-In Makes SAF Adoption Simpler

Eliminates need to change aircraft or fueling infrastructure



Source: OIG analysis of Boeing and FAA data

100% "Drop-In" SAF is a Reality

Demonstrated in the lab, test flights and in commercial applications

Extensive Ground Rig & Engine Tests

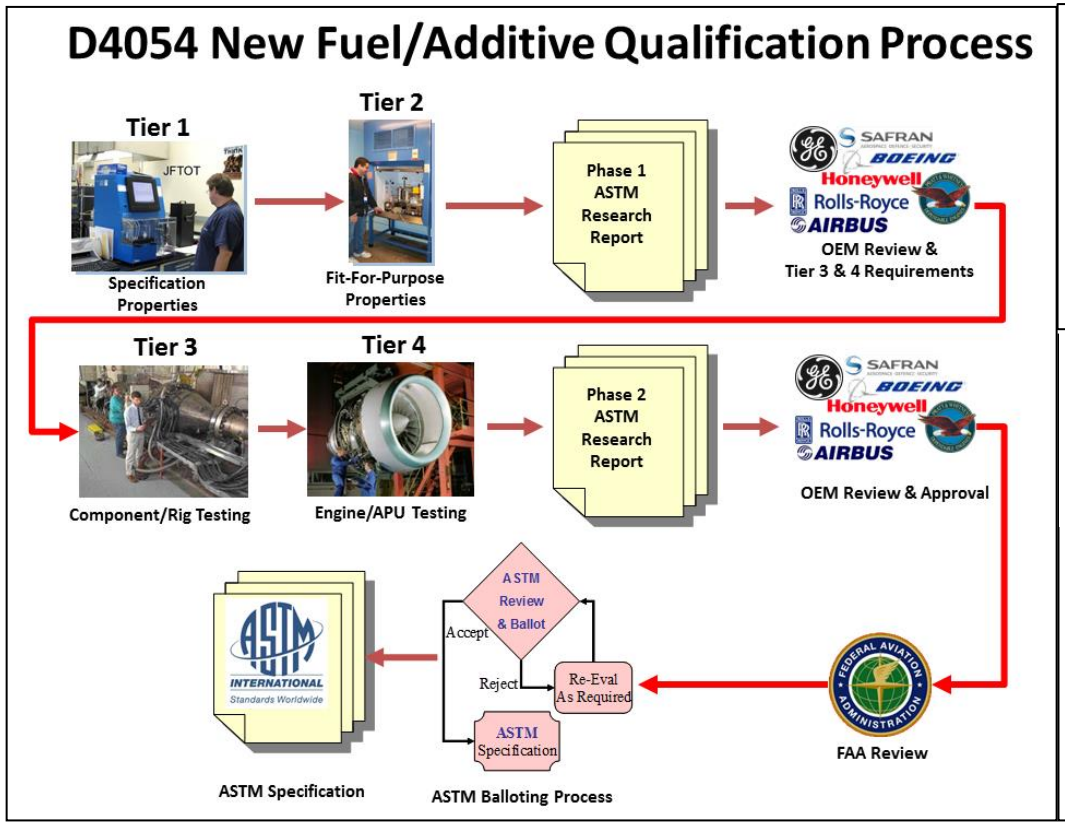
Successful Initial Test Flight

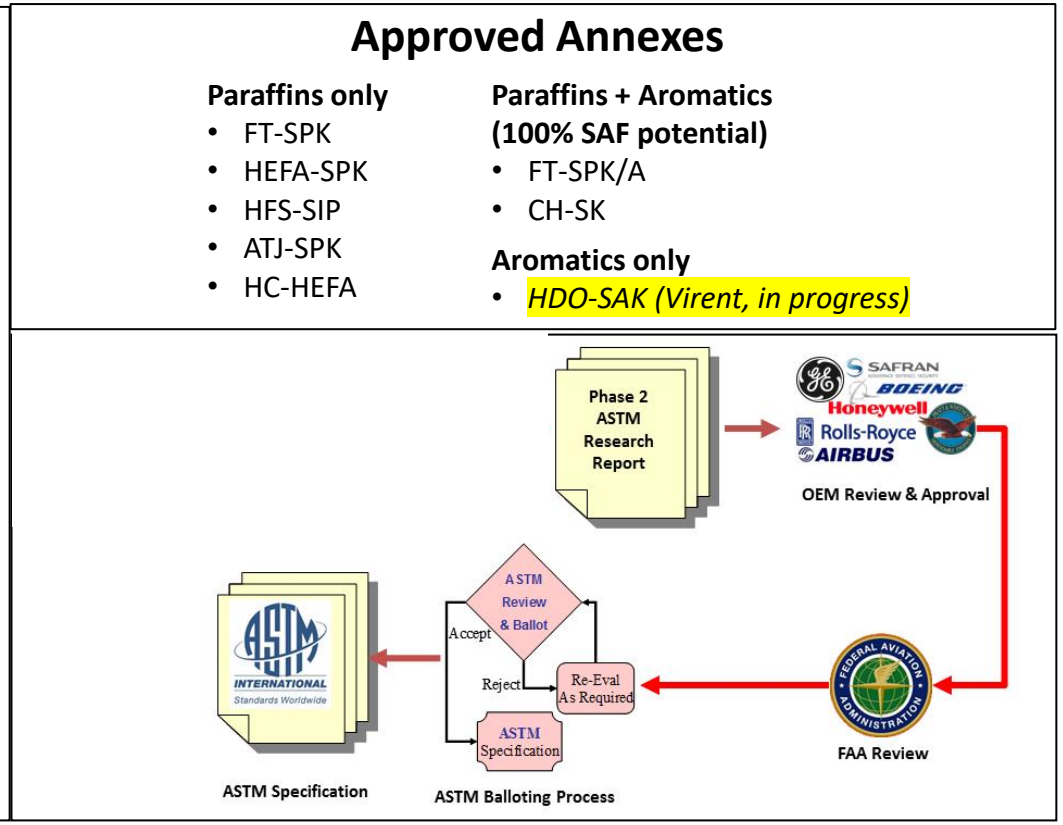
World's 1st 100% SAF Passenger Demo Flight

Final ASTM testing requirements under review with a target for completion and formal ASTM approval in 2022

Pursuing SAK Annex, then 100% Drop-In SAF

Working with industry at ASTM





1. **SAK** Annex in D7566 = SAK + Conventional Jet Fuel **Targeting Dec 2022 ballot**
2. **100% Drop-In SAF** Annex in D7566 = SAK + other SAF

BioForming® is Ready for Commercialization

Demonstrated process to produce renewable fuels and chemicals

Demonstrate & Optimize at Scale

- Fully integrated “Eagle” demo plant currently running with all recycles included
- Currently producing 0.75 bpd of BioFormate® product per day
- Over 30,000 hours of operation on Eagle to date
- Commercial scale catalysts loaded and performing as expected while achieving established targets
- Current focus is optimization

Product Demo & Marketing

- Over 30,000 gallons of BioFormate® produced
- Over 2,000 gallons of SAK produced for 100% SAF
- Over 15 tonnes of BioForm® PX produced
- Renewable gasoline fleet trials and EPA certification demonstrated acceptability for commercial use
- 100% drop-in SAF test flight in 2015 demonstrated equivalent performance & 35-70% lower PM emissions
- 100% drop-in SAF demonstration flight in 2021 validated readiness for commercialization

Working collectively to license the technology

JM | VIRENT

Key Development Partners

MARATHON · Cargill · INEOS Aromatics · JM · TORAY Innovation by Chemistry · Coca-Cola · GE Aviation · UNITED AIRLINES · BOEING

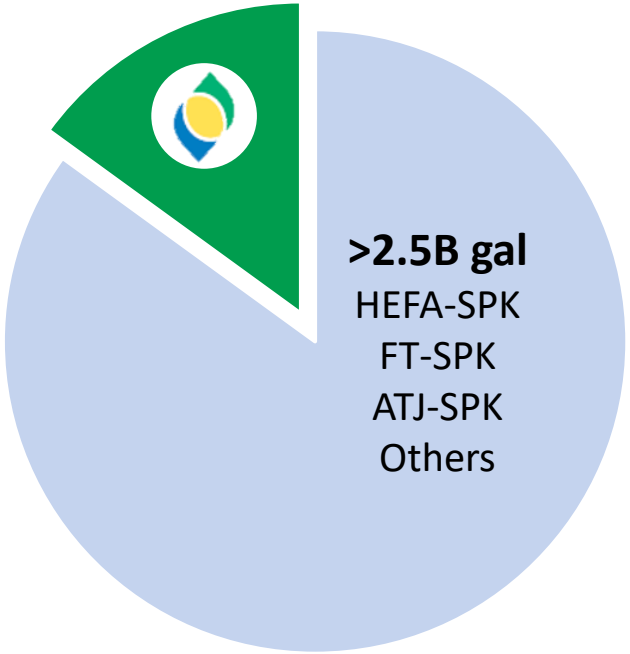
3B Gallons SAF Can Be 100% Drop-In with SAK

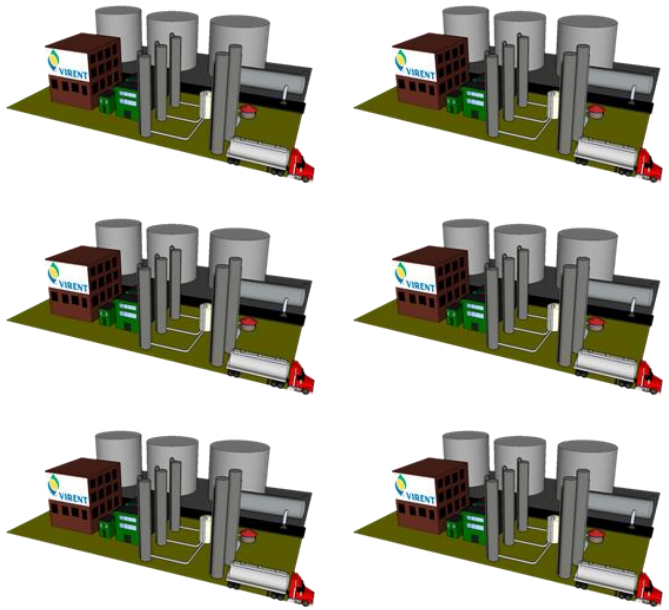
Example to meet US SAF grand challenge 2030 target and beyond

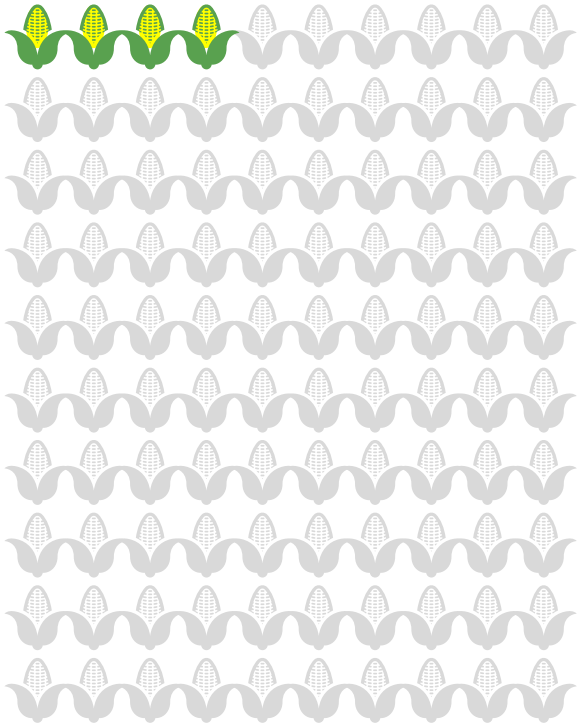
3B gal/yr 100% drop-in SAF → **450M gal/yr SAK** → **Only 4% of US corn sugar**

1B gal/yr total low CI fuel

or cane, beet, biomass sugars







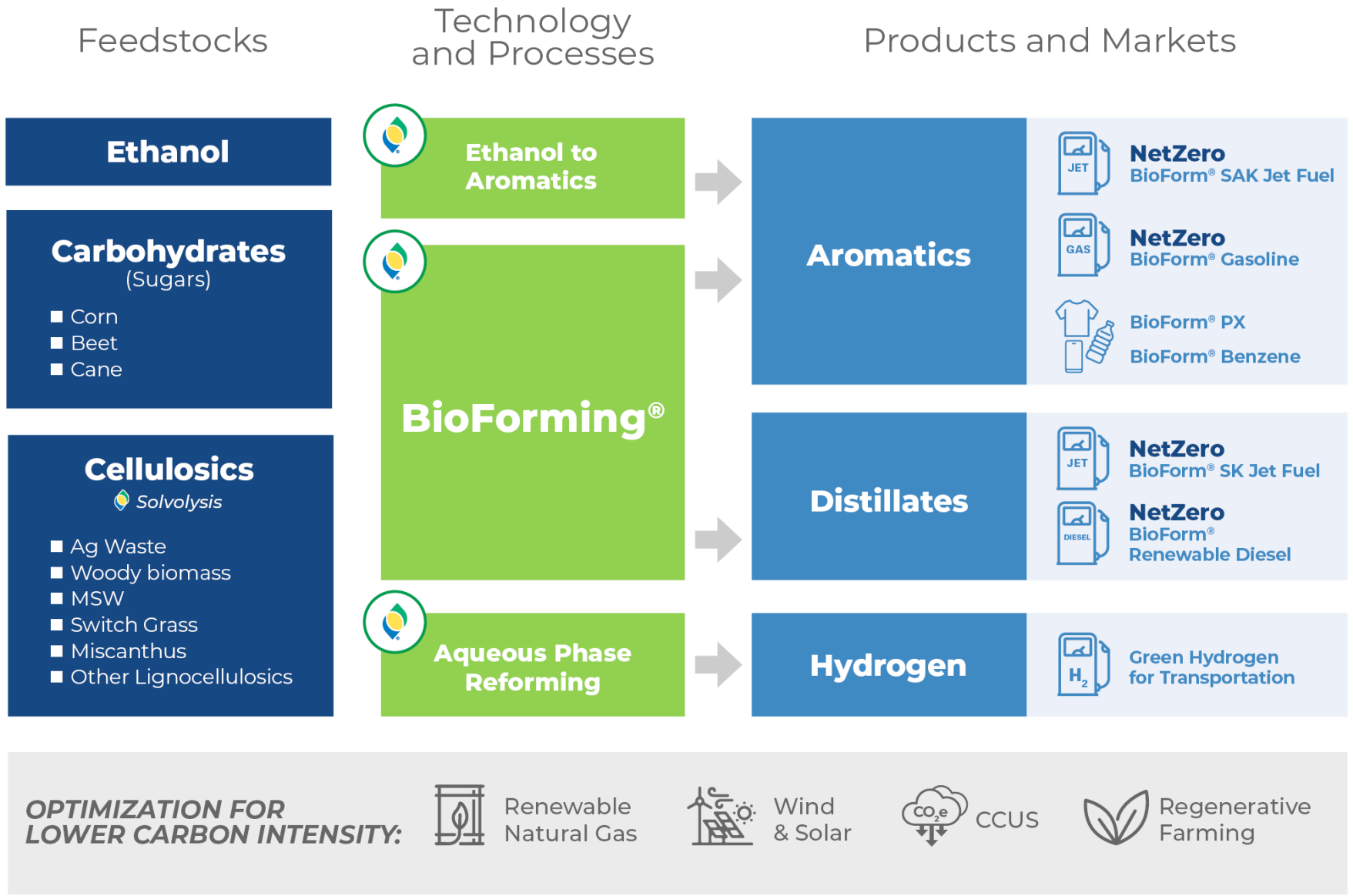
@ 15% SAK blend rate
assumes SPK = 760 kg/m³

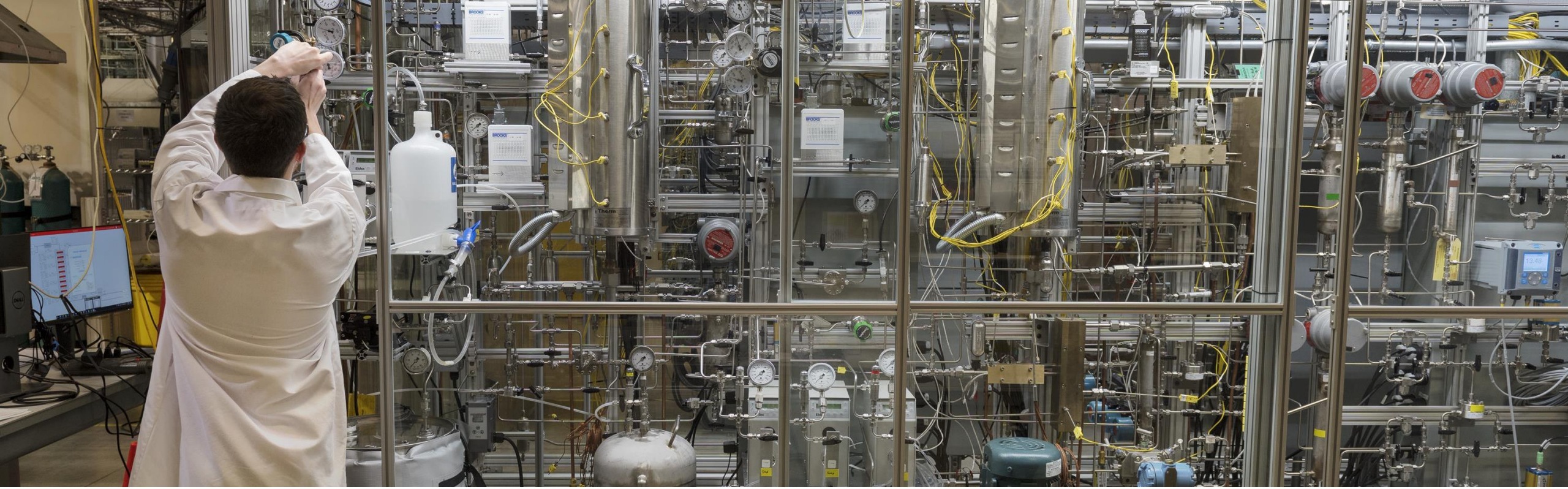
~6 BioForming plants

Future focus on biomass

Opportunities to Expand Markets

Broadening feedstocks & product offerings, further reducing carbon intensity





Thank you

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