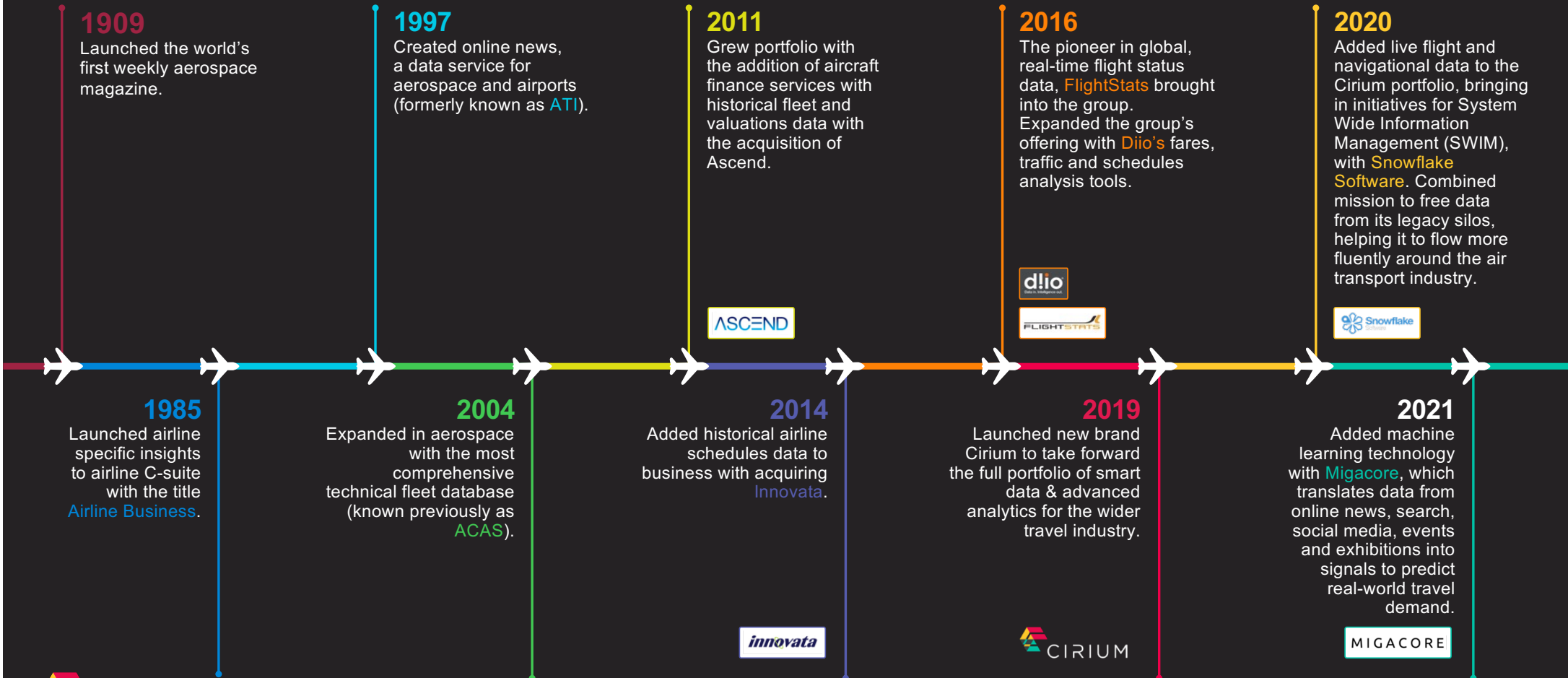# CIRIUM

Carbon budgets – a new way to address the environmental footprint of business travel

Andrew Doyle, Senior Director Market Development

13th June 2022

Passenger Experience Conference, Hamburg

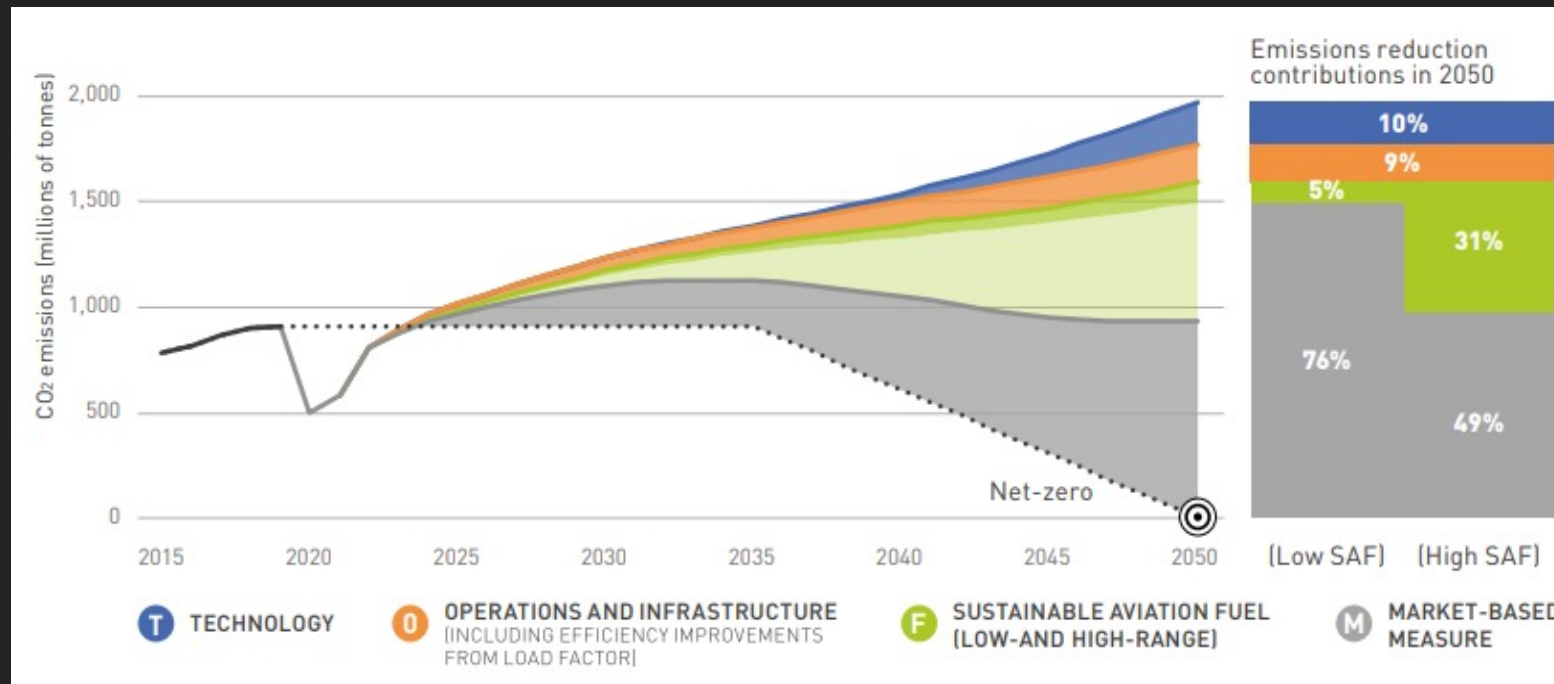# We created a new data analytics powerhouse under a new brand

1909
Launched the world's first weekly aerospace magazine.

1985
Launched airline specific insights to airline C-suite with the title Airline Business.

1997
Created online news, a data service for aerospace and airports (formerly known as ATI).

2004
Expanded in aerospace with the most comprehensive technical fleet database (known previously as ACAS).

2011
Grew portfolio with the addition of aircraft finance services with historical fleet and valuations data with the acquisition of Ascend.

2014
Added historical airline schedules data to business with acquiring Innovata.

2016
The pioneer in global, real-time flight status data, FlightStats brought into the group. Expanded the group's offering with Diio's fares, traffic and schedules analysis tools.

2019
Launched new brand Cirium to take forward the full portfolio of smart data & advanced analytics for the wider travel industry.

2020
Added live flight and navigational data to the Cirium portfolio, bringing in initiatives for System Wide Information Management (SWIM), with Snowflake Software. Combined mission to free data from its legacy silos, helping it to flow more fluently around the air transport industry.

2021
Added machine learning technology with Migacore, which translates data from online news, search, social media, events and exhibitions into signals to predict real-world travel demand.

CIRIUM

2

For the first time, Cirium has brought the industry's core datasets under one roof

Schedule
- MCT
- Cabin Fit
- Codes
- Connections
- Alliances
- Future plan

Fleet
- Hours & Cycles
- Owners
- Cabin Fit
- Aircraft values
- Technical fit
- Market

Flight
- OOOI
- Delay/cancel
- Status/ OTP
- Position
- Weather
- Flight plan

Fare
- QSI
- Trip break
- US tickets
- Global traffic
- US traffic
- Global tickets
- Fare offers

Trip
- PNRs
- Traveler alerts
- Iteneraries
- Waivers
- Fair share
- Trip outcome

These core datasets form the foundation…

…on which we can build high value analytics

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3

Sustainability roadmaps and long-term goals

- IATA and ATAG have both produced Net Zero roadmaps for the commercial aviation sector to 2050
- Many assumptions have been made in these forecasts, and there is huge sensitivity to different inputs
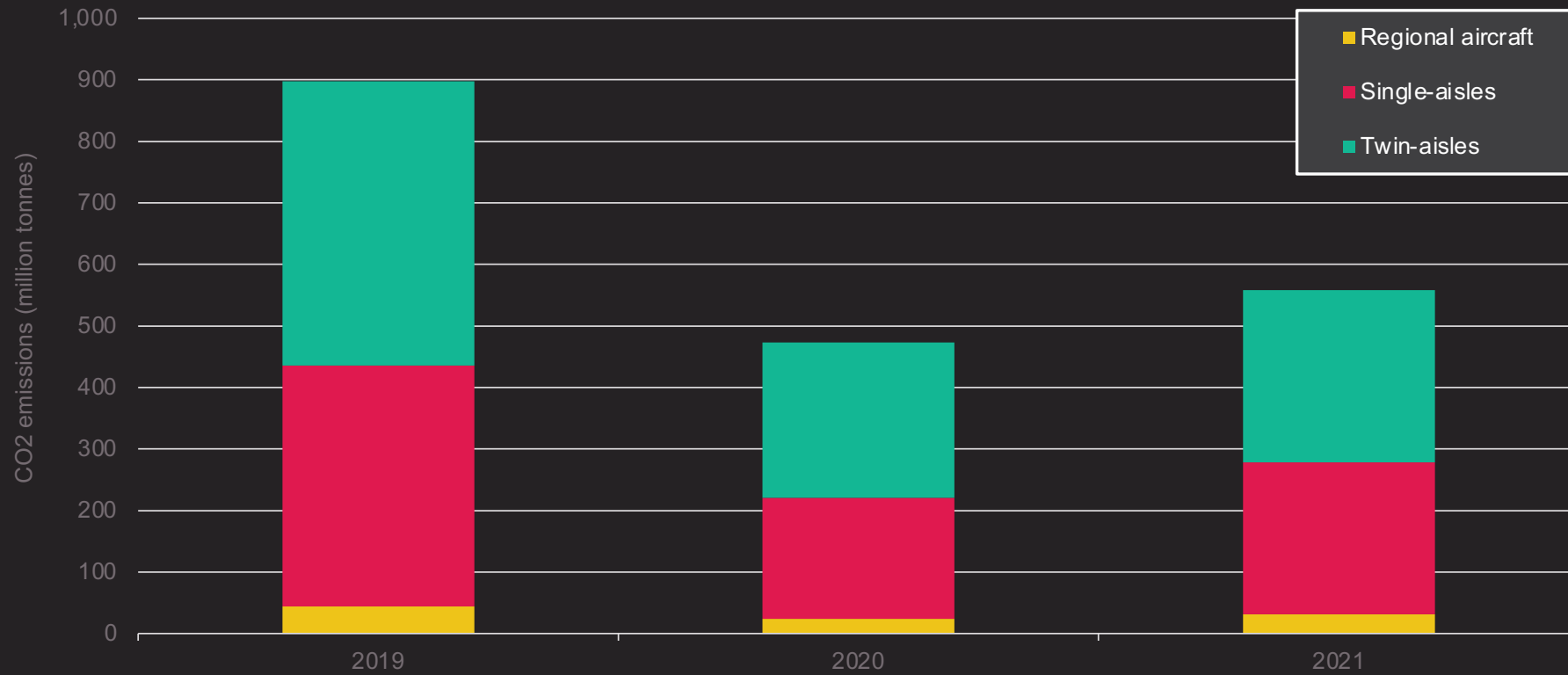- ATAG's 2021 'Waypoint 2050' baseline scenario is shown below. The major contribution of SAF is clear

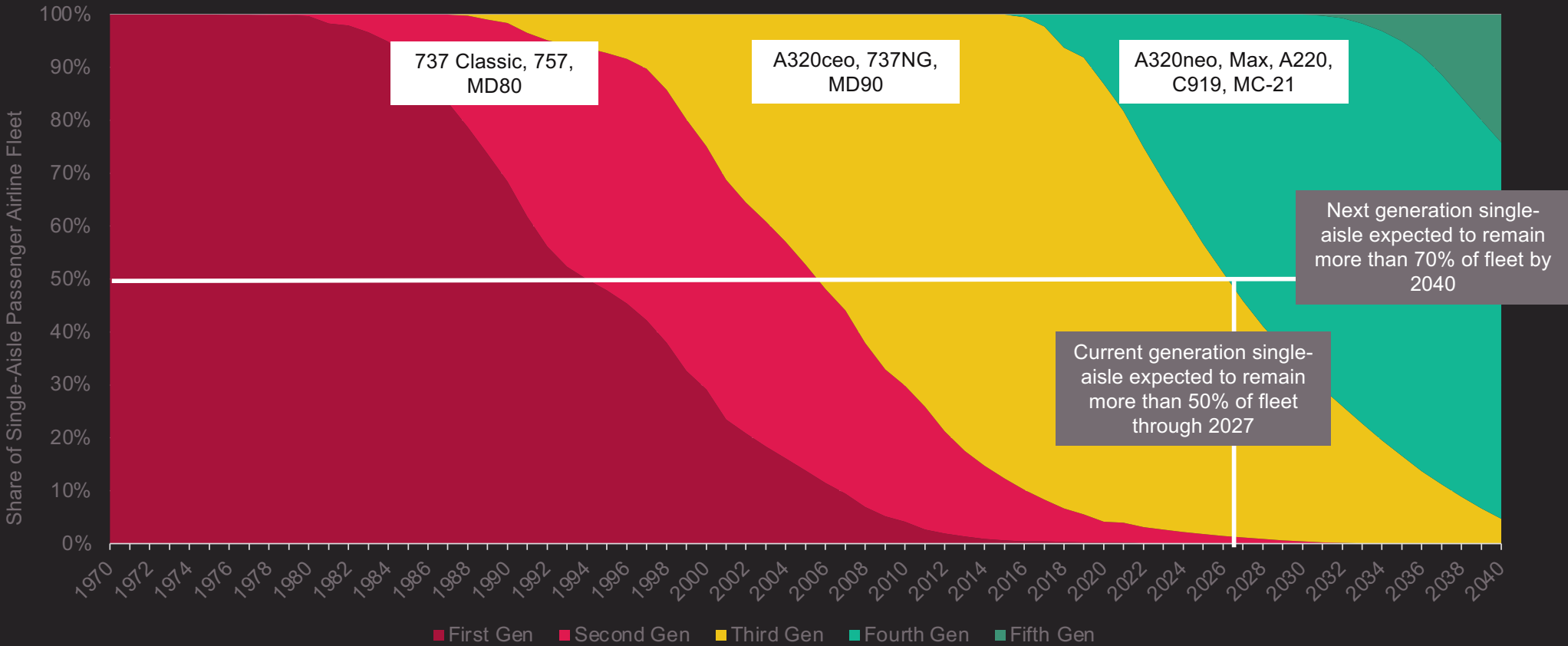There has been a substantial reduction in unit emissions since 2004

ASCEND
BY CIRIUM

Index (2004 = 100)

Legend:
- Global RTKs
- Global CO2 emissions
- CO2/RTK

In the 15 years to 2019:
Traffic (RTKs) up 115%
CO2 emissions up 44%
CO2/fuel burn per RTK down 29%

2004:
Passenger Load
Factor = 73.5%

2019:
Passenger Load
Factor = 82.6%

Due to Covid:
2021 emissions lower than in 2004.
CO2/RTK rose in 2020 due to fall
in load factors

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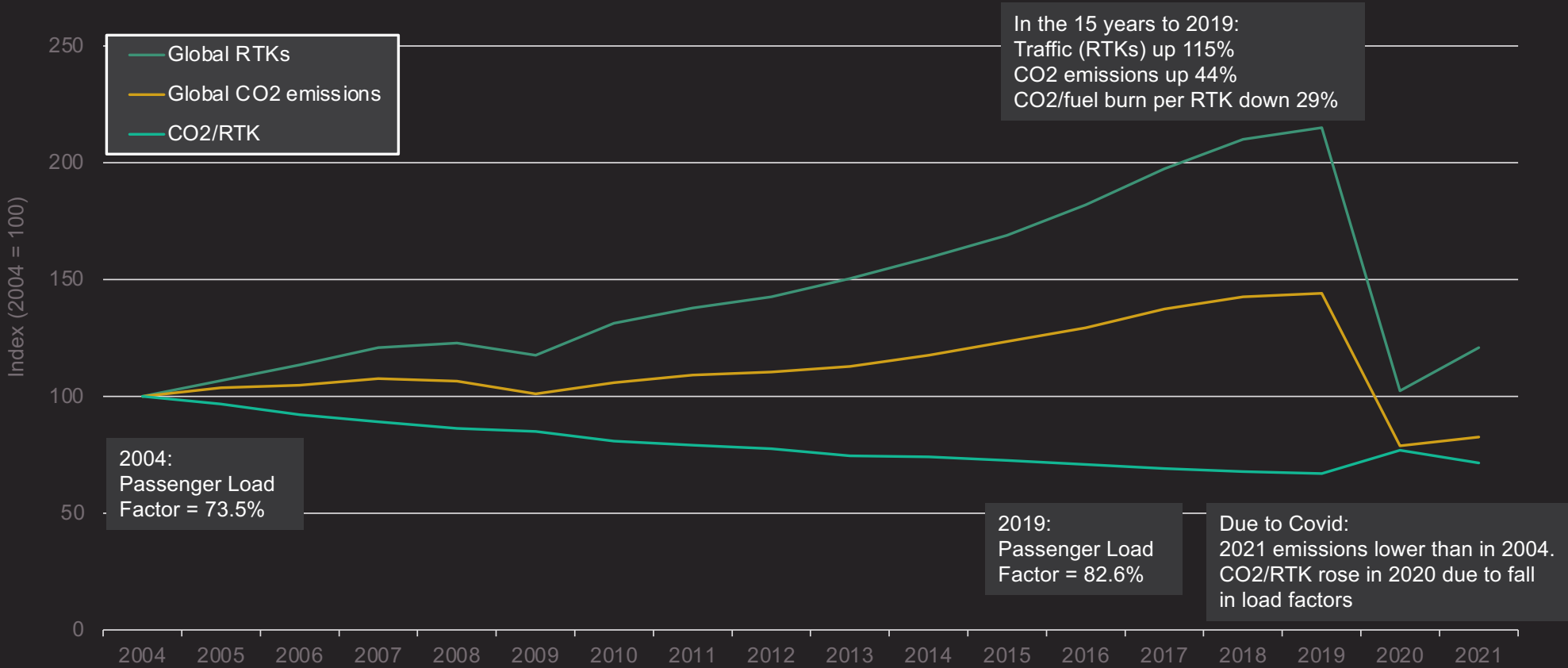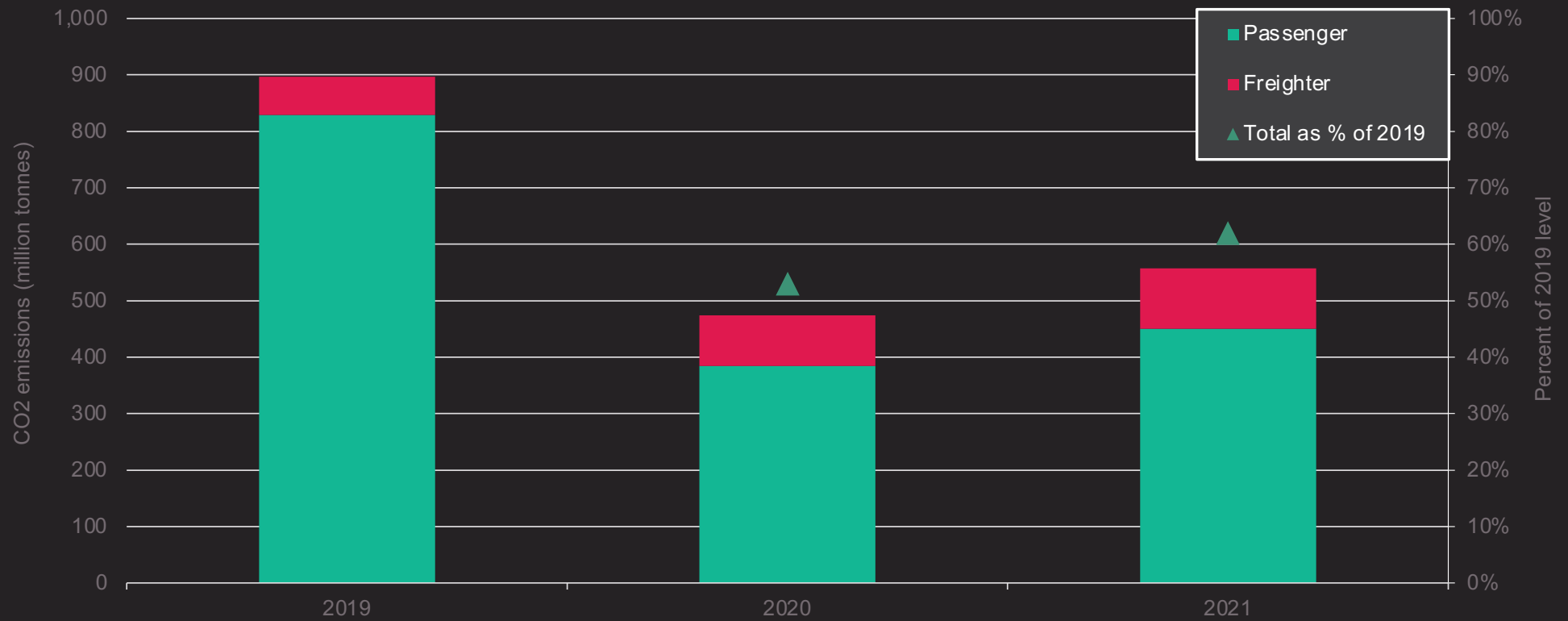
Long-haul twin-aisles made up 51% of CO_2 emissions in 2019, and are the hardest to replace with electric/hydrogen-powered aircraft

Fleet inertia presents a huge challenge to decarbonisation from a technology perspective

ASCEND
BY CIRIUM

Share of Single-Aisle Passenger Airline Fleet

737 Classic, 757, MD80

A320ceo, 737NG, MD90

A320neo, Max, A220, C919, MC-21

Next generation single-aisle expected to remain more than 70% of fleet by 2040

Current generation single-aisle expected to remain more than 50% of fleet through 2027

- First Gen
- Second Gen
- Third Gen
- Fourth Gen
- Fifth Gen

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I.C.I.S suggests 3% SAF usage by 2030 led by North America & Europe, but long-term supply is highly uncertain, depending on synthetic e-fuels
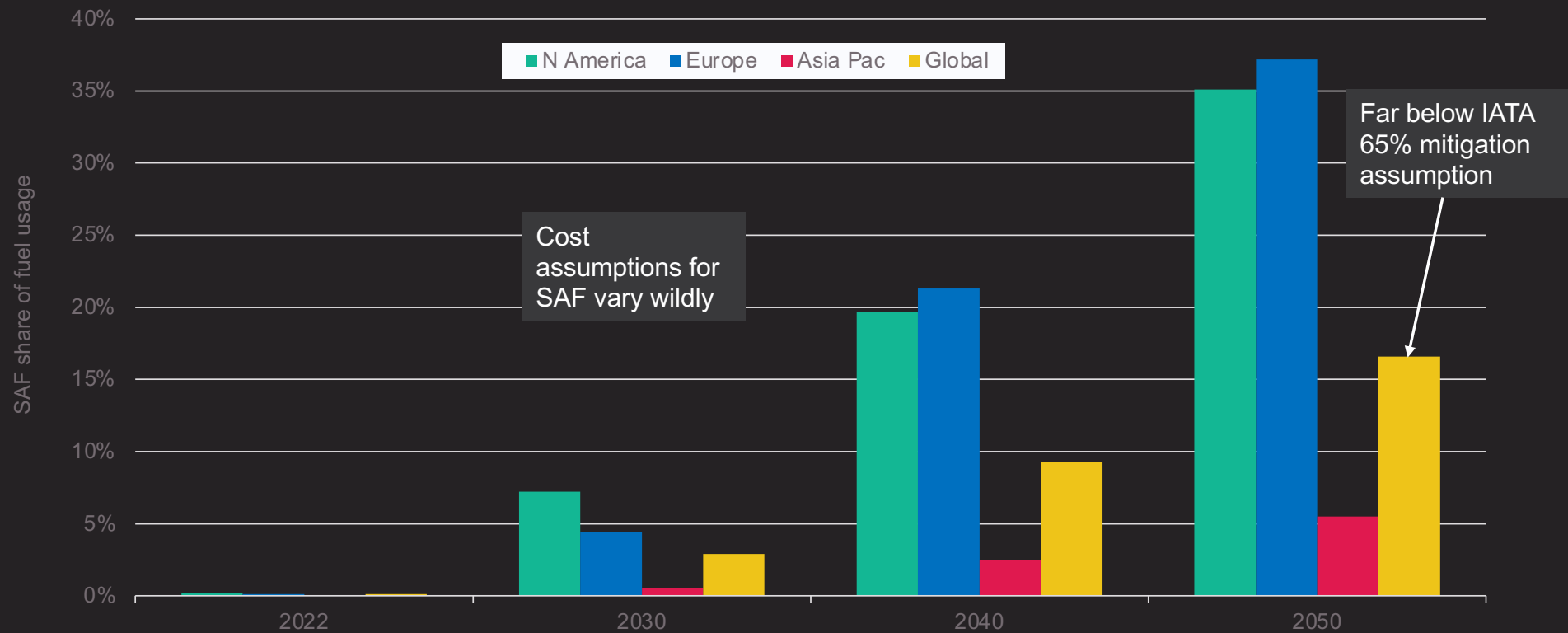
Committing to Net Zero requires measuring Scope 3 emissions

Scope 1 | Direct emissions — Emissions from operations that are owned and controlled by the reporting company

Scope 2 | Indirect emissions — Emissions from the generation of purchased electricity, steam, heating & cooling consumed by the reporting company

Scope 3 | Indirect emissions — Emissions that occur in the supply chain of the reporting company, including both upstream and downstream

Most challenging to quantify but represents the biggest opportunity for reduction (accounting for up to 85-95% of a company's carbon footprint)

https://www.cnbc.com/2021/08/18/apple-amazon-exxon-and-the-toughest-carbon-emissions-to-capture.html

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Cirium is taking a data driven approach to calculating aviation emissions to improve the accuracy and consistent application across all airlines

1
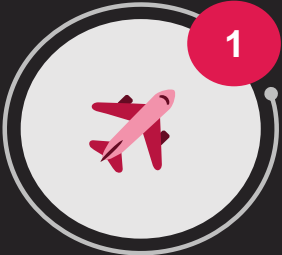
Physical Aircraft

Variation of types, engines, and other modifications to improve emissions

2

Flight Operations

Actual flight time is far more relevant than distance in determining fuel burn

3

Seat Dimensions

Seat configurations and dimensions for the same aircraft type can vary greatly by airline
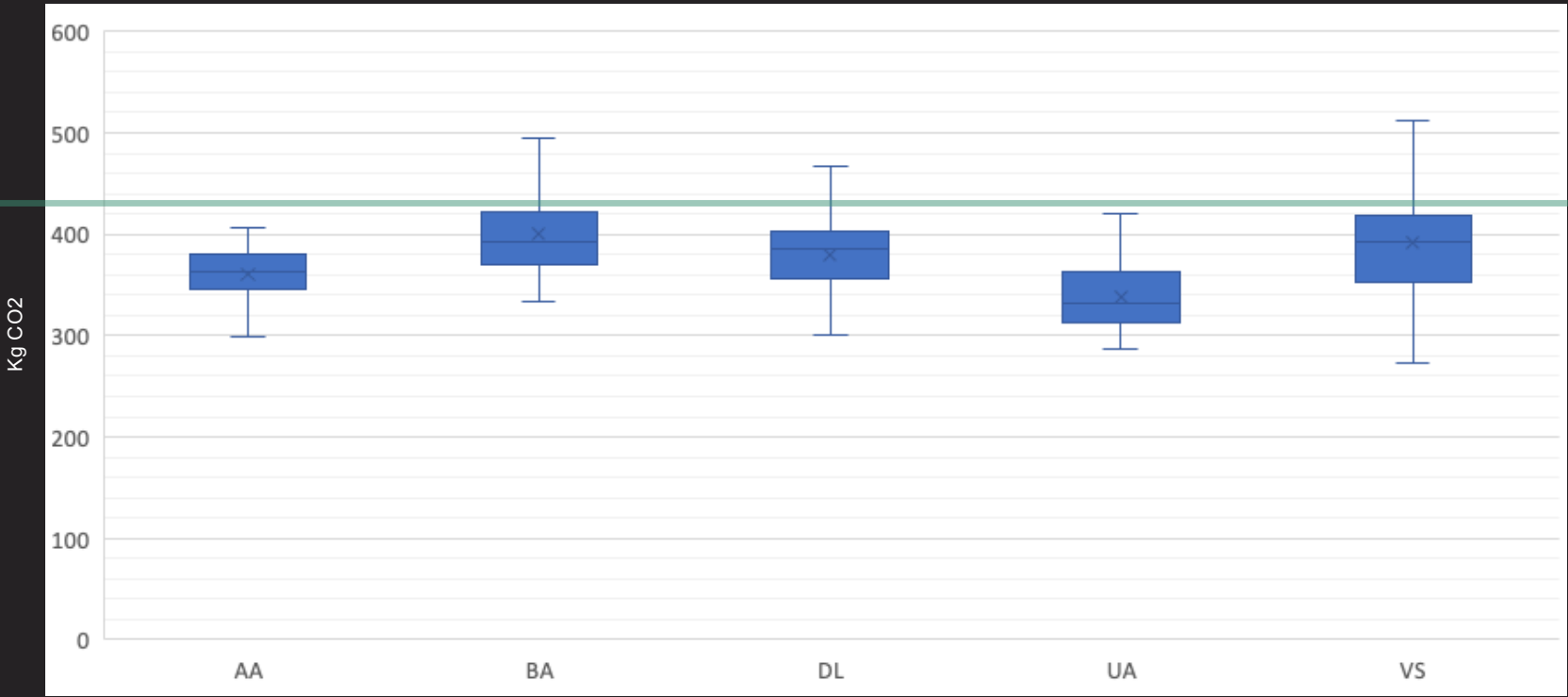
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Taking a Data Driven Approach to Emissions

Working with airlines, manufacturers and industry organizations on accurate, unbiased & comparable insight

CIRIUM

Case study: CO$_2$ generated from non-stop NYC-LON economy flights purchased by company's employees *vary by airline and within an airline*

DEFRA economy class estimation

Kg CO2

600
500
400
300
200
100
0

AA   BA   DL   UA   VS

Source: The Cirium Core, emissions & corporate ticketing data, 2019

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Example: Daily flight Singapore-Helsinki

Dep. date	Aircraft master series	Great circle distance (km)	Flight time (h)	Taxi time (min)	Aircraft age (yr)	Seats by class	Cirium estimated block fuel / CO2 (t)*
Sat 5th June 2021	A350-900	9,274	10.9	17	1 MSN 410	32 J 304 Y (336)	64.6 / 204.3
Sat 4th June 2022	A350-900	9,274	12.8	23	6 MSN 022	43 J 24 W 211 Y (278)	78.6 / 248.4

* Assumes 84% passenger load factor and cargo payload of 12.6t

…CO_2 calculators using great circle distance and generic aircraft type/cabin class alone do not provide sufficient accuracy to make 'apples to apples' comparisons between flight options

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Carbon budgets: A new way to address environmental footprint of business travel

Corporations worldwide are starting to explore implementation of carbon budgets, but a granular, trusted and neutral benchmark for emissions data is needed…

- 'Cheapest' flights will not necessarily be those with the lowest dollar price

- Requires forward-looking as well as historical views, by operator/aircraft type/seat

- Likely to increase demand for longhaul premium economy cabins (?)