

The cost of inaction

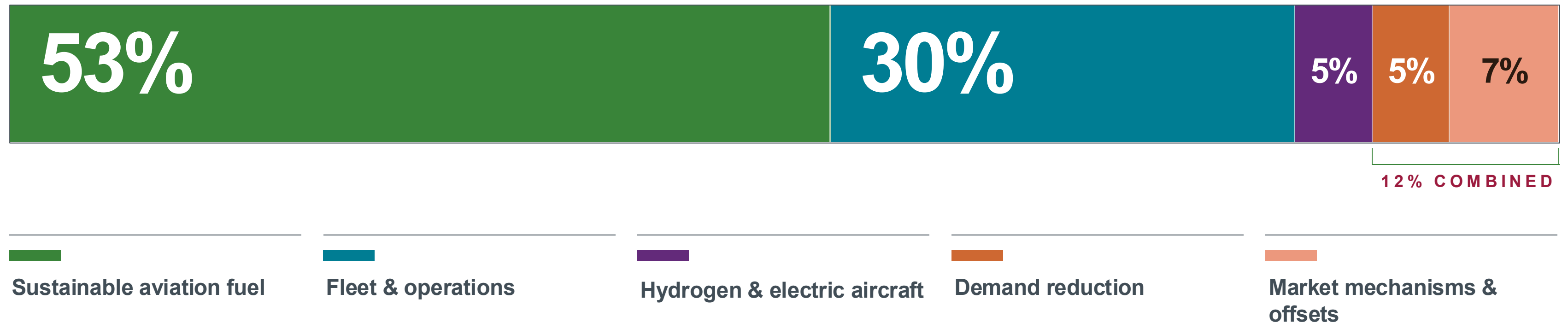
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Aviation's net-zero pathway

Based on IATA's review of nine roadmaps and fourteen scenarios



SAF is the lever.

Demand and market mechanisms play only a tiny part.

SAF is being delivered at a fraction of the rate the pathways assume

IATA (2024) · current production vs roadmap milestones

0.3 %

of global jet fuel · 2024

1 Mt SAF vs ~350 Mt jet-fuel demand. IATA: "disappointingly slow growth".

The shortfall is structural, not a slip

- Feedstock ceiling on HEFA pathways.
- Off-take repeatedly renegotiated as capacity slips.
- Policy support patchy — no globally consistent price signal.

2030 target

5–8 %

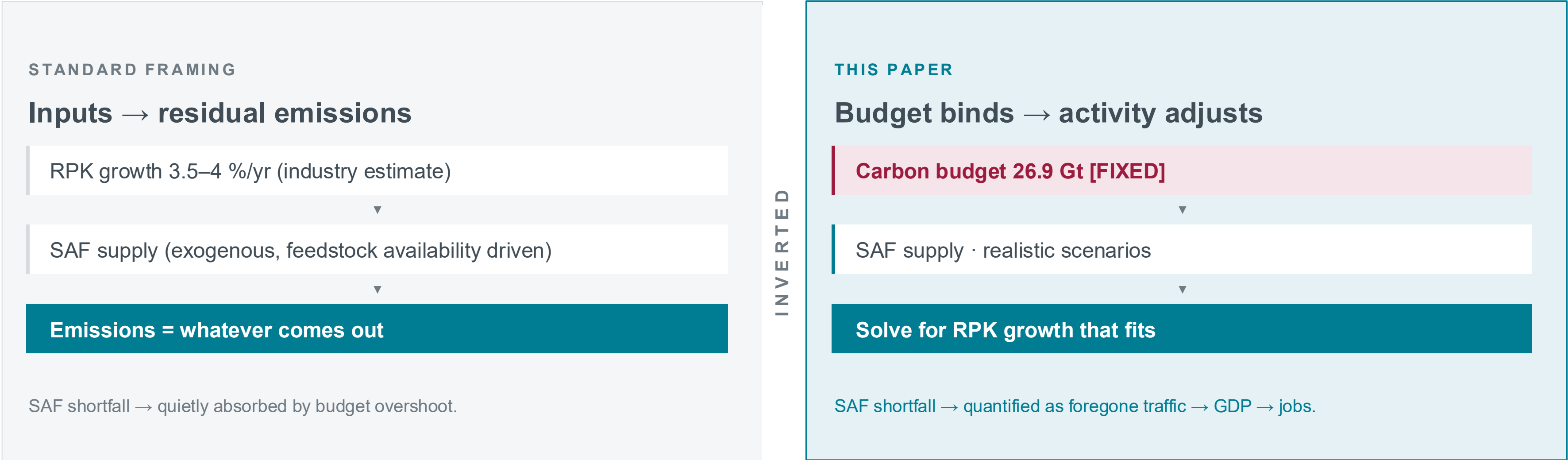
2050 target

70-100%

Meanwhile, most fleet plans and airport investment still embed 3.5–4 % growth rate assumption, raising questions about the plausibility of net zero pathways.

We invert the question: hold emissions fixed, solve for travel demand

Cumulative aviation CO₂ 2023–2050 fixed at 26.9 Gt



Estimate economic impacts of demand reduction

\$4.1 trillion contribution to global GDP; **86.5 million** jobs supported by air transport

Key technology assumptions by scenario

Three SAF-deployment trajectories under a fixed 26.9 Gt carbon budget

Scenario	2030 SAF Blend	2050 SAF Blend	Reference
Deep Decarbonization	8%	70%	IEA Net Zero Emissions (NZE) PACE GHG Forward
Sustained Action	5%	40%	IEA Announced Policies Scenario (middle ground)
Announced Policies	2%	10%	PACE Current Commitments

Shared assumptions across all three scenarios

- Aircraft efficiency improves 1.1% per year
- Operational efficiency improves 0.5% per year
- Electric commuter and hydrogen regional jet entry in 2030s

Aggressive demand constraint needed to compensate for low SAF

Required RTK 2023–2050 to stay within the 26.9 Gt budget

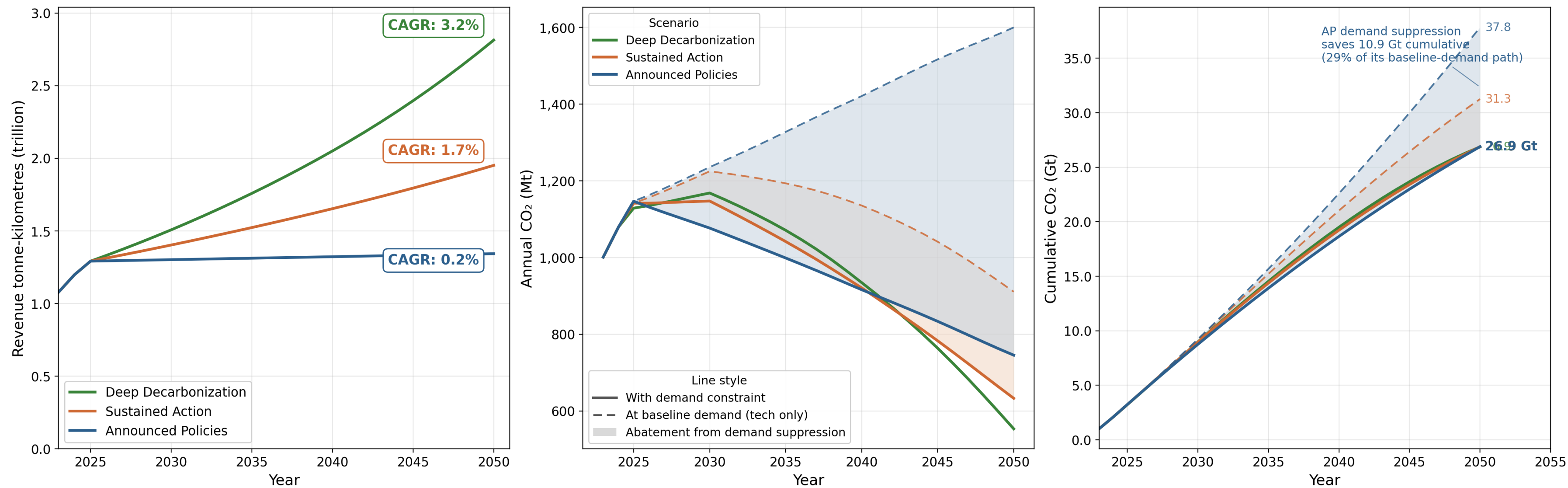
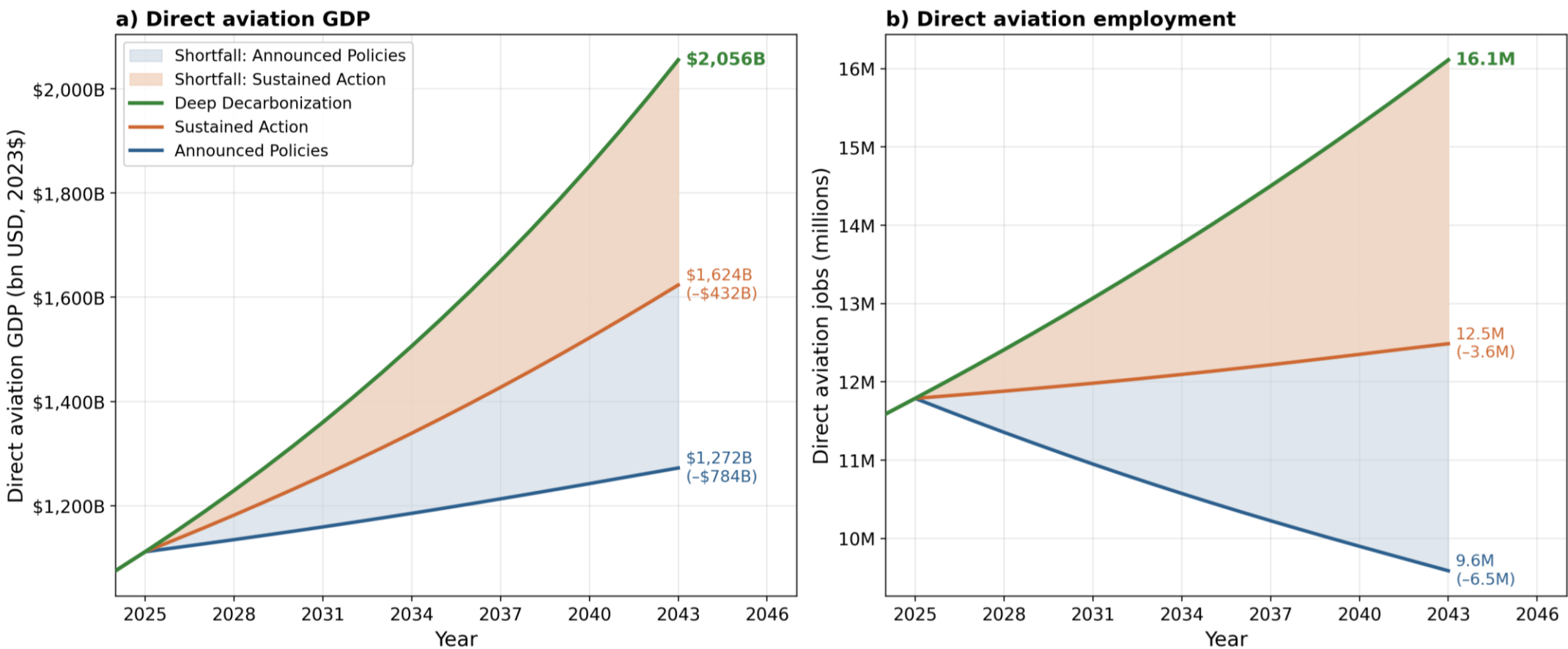


Figure 1. Revenue tonne-kilometres required to stay within the carbon budget under each scenario. Implied CAGRs across 2023–2050. Resulting annual and cumulative global aviation CO₂ emissions, compared with pre-constraint emissions under each scenario.

Constrained traffic translates linearly into foregone GDP and jobs

Scaled using ATAG country-level direct GDP & employment



\$3.5–6.6 Cumulative direct GDP shortfall.
trillion · 2024–2043 Sustained Action → Announced Policies, in 2023 prices.

33–61 Cumulative direct employment
million job-years shortfall. Traceable to specific countries via ATAG country-level baseline.

Figure 2. Annual direct aviation GDP (left) and employment (right) under the three scenarios. Shaded = shortfall vs Deep Decarbonization counterfactual. 2024–2043.

Concentrated where growth was supposed to come from

Sustained Action scenario vs Deep Decarbonization baseline

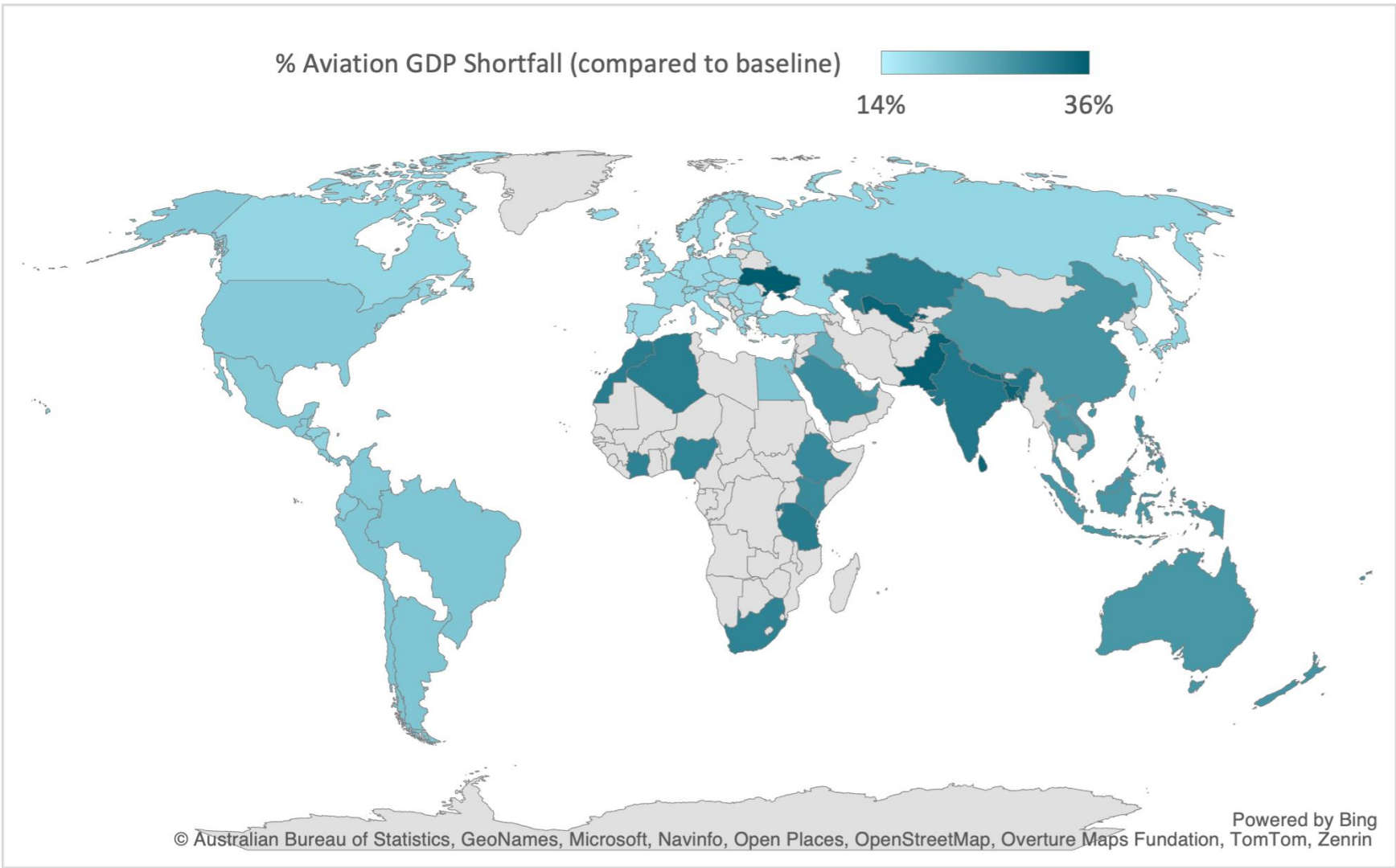
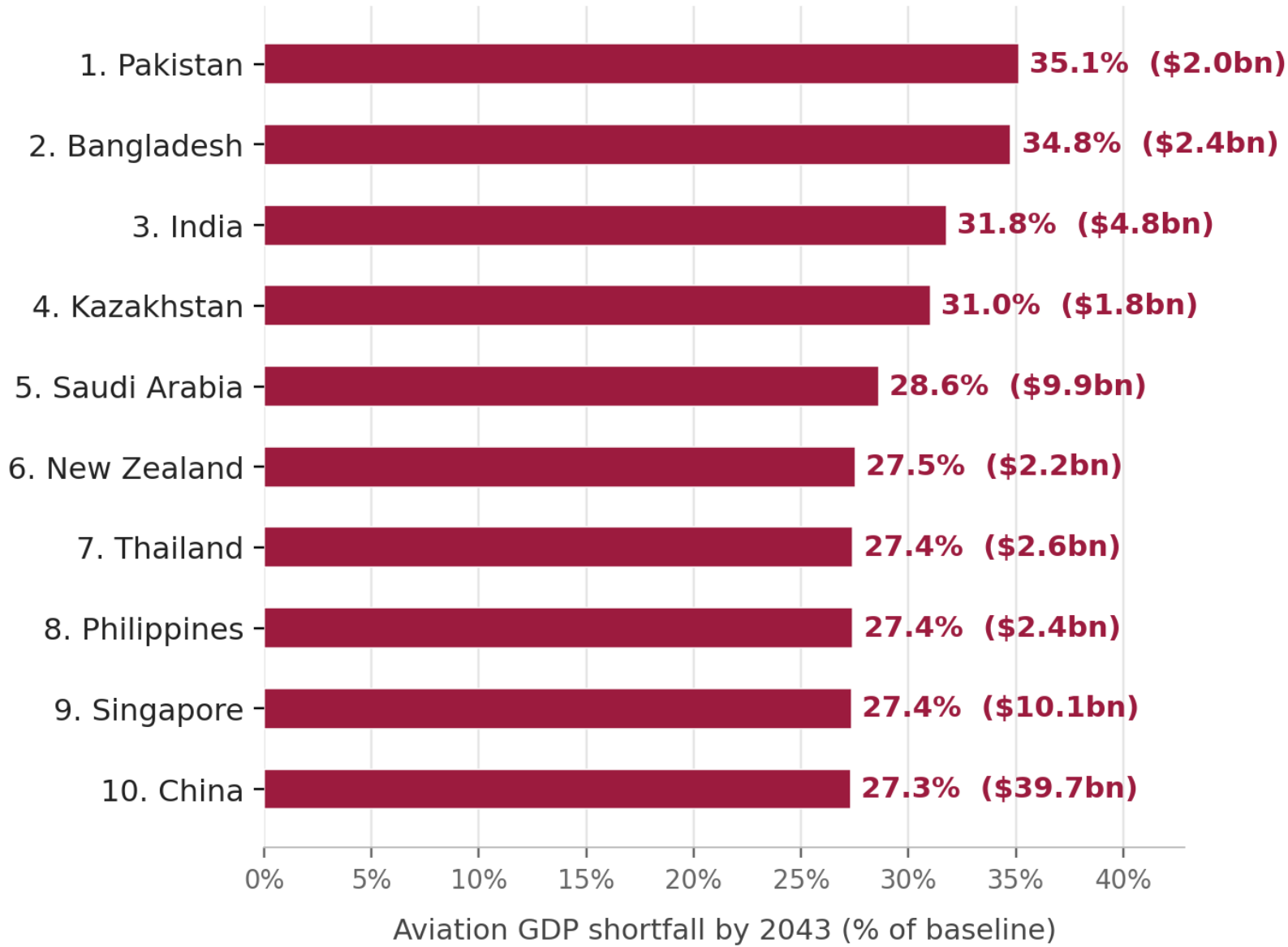


Figure 3. % aviation GDP shortfall in 2043 by country. Asia-Pacific, Middle East and parts of Latin America in the darkest band; mature NA & Europe at 14–20 %.

Top 10 countries by 2043 aviation GDP shortfall (%)

Countries with > \$1bn absolute shortfall · Sustained Action vs Deep Decarbonization



THE HEADLINE

Cost of action vs cost of inaction

Decarbonization investment to 2050 vs direct GDP shortfall to 2043

COST OF ACTION

SAF, fleet & infrastructure investment

\$4–5 trillion

Decarbonization roadmaps published by ICAO, IATA, MPP

Time Horizon: 2022 - 2050.

VERSUS

COST OF INACTION

Foregone direct aviation GDP

\$3.5–6.6 trillion

Sustained Action scenario → Announced scenario Policies cumulative shortfall.

Time Horizon: 2023 - 2043.

Even counting **only direct impacts**, the cost of inaction to 2043 is roughly **two-thirds of the high estimate** for the cost of action to 2050.

KEY TAKEAWAY

Implications for sustainable aviation finance

Where the cost accrues — and what to do with that

01 · PRICING

The SAF supply gap is underpriced in transition-risk disclosure.

Holding emissions at the 26.9 Gt budget while SAF underdelivers implies 0.2% RTK growth — a 95% haircut to the 3–4% trajectory assumed by industry. Translating into revenue, direct aviation GDP arrives 38% lower than the assumed growth path by 2043.

→ **Stress-test growth against SAF delivery, not roadmap milestones.**

02 · GEOGRAPHY

SAF capacity needs to follow the growth, not legacy hubs

Modelled aviation GDP shortfall is most pronounced for emerging Asia (Pakistan 35%, Bangladesh 35%, India 32%) and capacity-constrained hubs (Saudi Arabia 29%, Singapore 27%), reflecting the larger challenge of sustainable growth.

→ **Country, hub, carrier-level analysis would be more informative than sector aggregates.**

03 · POLICY FRAMING

The investment case does not rest on GDP shortfall alone.

The \$3.5–6.6T shortfall is one lens for the cost of inaction; the harsher cost of climate damages would be the alternative. Meanwhile, the \$4–5T cost of action buys durable assets: SAF capacity, fleet renewal, and infrastructure.

→ **Finance supply side now, on par with airworthiness or noise compliance.**

Bottom line. The cost of inaction is not abstract — it accrues to specific regions, specific workers, over a tractable horizon, and on plausible accounting is at least as large as the investment required to avoid it.