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Towards Net-Zero: Analyzing Sustainability Reports of Global Airlines

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Abstract: *The aviation industry faces significant pressure to reduce its environmental footprint, aligning with global net-zero targets. This study systematically evaluates sustainability reporting among major global airlines through thematic, comparative, sentiment, and gap analyses. Utilizing publicly available sustainability reports from ten leading airlines, the research employs content analysis to identify prevalent themes, transparency practices, and strategic reporting gaps.*

Findings highlight "Carbon Management," "Transparency and Reporting," and "Alternative Fuels" as the most frequently discussed sustainability themes. Clustering analysis reveals three distinct reporting profiles: comprehensive reporters emphasizing detailed ESG disclosures, moderate reporters focusing primarily on carbon emissions, and limited reporters exhibiting minimal sustainability coverage. Sentiment analysis indicates varying degrees of positivity, with airlines generally adopting optimistic language to portray sustainability initiatives, although with notable differences in objectivity and subjectivity.

A gap analysis assessing alignment with established ESG reporting frameworks (GRI, SASB, TCFD) uncovers significant discrepancies, suggesting a need for greater industry standardization. Strong correlations emerge between carbon management practices, transparency levels, and governance structures, reinforcing the importance of comprehensive and transparent ESG disclosure.

This research highlights transparency gaps and best practices in airline sustainability reporting, providing valuable insights for enhancing industry-wide ESG standards. Findings carry implications for airlines, policymakers, and investors, advocating enhanced accountability and strategic alignment to effectively advance towards global net-zero aviation goals.

Keywords: *Sustainability Reporting, Airline Industry, Content Analysis, Thematic Analysis, ESG, Net-Zero.*

INTRODUCTION

The aviation industry plays a crucial role in global connectivity and economic growth, yet it faces increasing scrutiny over its environmental impacts, particularly its significant contribution to greenhouse gas emissions (IATA, 2023). With growing global urgency to address climate change, airlines are under pressure to transparently disclose their sustainability strategies and demonstrate genuine progress towards reducing their carbon footprints. Sustainability reporting serves as an essential tool for stakeholders, including investors, regulators, and customers, to evaluate and monitor airlines' commitments and performance against environmental, social, and governance (ESG) criteria (GRI, 2022).[1]

Sustainability reporting provides stakeholders insight into airlines' strategies, practices, and performance regarding environmental, social, and governance dimensions. Despite the industry's stated commitments to ambitious targets such as achieving net-zero emissions by 2050, the quality, transparency, and comprehensiveness of sustainability disclosures vary significantly among airlines.(ICAO, 2023). This variability poses challenges for stakeholders seeking consistent and comparable information to evaluate progress effectively.[2]

This study conducts a content analysis of publicly available sustainability reports from ten major global airlines. By identifying and comparing thematic coverage, reporting transparency, and alignment with established environmental, social, and governance (ESG) frameworks such as the Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), and the Task Force on Climate-related Financial Disclosures (TCFD), the paper aims to highlight transparency gaps, identify industry trends, and recommend best practices.

The findings offer valuable insights for airlines, regulators, investors, and stakeholders seeking to advance sustainability and accountability in global aviation.

LITERATURE REVIEW

Sustainability reporting has become an essential practice for corporations globally, driven by growing societal expectations and regulatory demands. Airlines face unique sustainability challenges due to aviation's contribution of approximately 2-3% of global carbon emissions, a share anticipated to grow without significant interventions (ICAO, 2023). Although airlines broadly recognize these challenges, substantial variability exists in the comprehensiveness, transparency, and strategic depth of sustainability disclosures among leading global airlines.[3]

Qualitative comparative analysis reveals that airlines such as Delta Air Lines, United Airlines, and Emirates consistently exhibit comprehensive sustainability reporting, with clearly articulated carbon management strategies, transparent disclosure of progress, and proactive stakeholder engagement. Conversely, airlines like Air France-KLM and Singapore Airlines demonstrate limited thematic reporting coverage, often presenting sustainability initiatives in generalized or less detailed terms. European airlines, notably Lufthansa Group and International Airlines Group, typically emphasize regulatory compliance frameworks, highlighting structured reporting aligned explicitly with standards such as GRI and TCFD, although detailed disclosures of Scope 3 emissions remain relatively inconsistent.

In contrast, American Airlines and Qantas provide balanced qualitative disclosures, explicitly outlining clear interim targets, sustainability initiatives, and governance structures. Turkish Airlines notably emphasizes community and social responsibility initiatives but lacks specificity in interim environmental targets. Overall, airlines actively report on carbon management, alternative fuels such as Sustainable Aviation Fuel (SAF), and ESG governance structures, yet significant transparency gaps persist, particularly around indirect (Scope 3) emissions and explicit third-party assurance.[4]

Previous academic research highlights varying degrees of sustainability reporting across global airlines, indicating diverse reporting standards and levels of transparency (Karaman, Kilic, & Uyar, 2020). Amran and Ooi (2014) assert that clear and standardized sustainability reports significantly enhance stakeholder engagement and organizational legitimacy. Further studies demonstrate that factors such as regulatory pressure and stakeholder influence heavily shape airlines' sustainability disclosures (Kılıç & Kuzey, 2018; De Grosbois, 2016)

This comparative summary highlights the necessity of standardized reporting practices, explicitly aligning airline disclosures with recognized ESG frameworks to improve transparency, comparability, and accountability across the aviation industry.[5]

RESEARCH OBJECTIVES

The primary objectives of this research are to:

1. Conduct a thematic analysis to identify prevalent sustainability themes across major airline sustainability reports.
2. Conduct clustering analysis to group airlines based on thematic reporting similarities.
3. Perform comparative sentiment analysis to assess the tone and objectivity in airline sustainability reporting.
4. Conduct a gap analysis evaluating airline disclosures against established ESG reporting standards (GRI, SASB, TCFD).

5. Identify best practices and transparency gaps to recommend improvements in airline sustainability reporting standards.

RESEARCH METHODOLOGY

This study utilizes a qualitative content analysis approach. Publicly available sustainability reports from ten leading global airlines were systematically collected and analyzed. The selected airlines are:

1. Emirates
2. Air France-KLM
3. International Airlines Group (IAG)
4. American Airlines
5. Delta Air Lines
6. United Airlines
7. Qantas Airways
8. Turkish Airlines
9. Lufthansa Group
10. Singapore Airlines

The methodological approaches included:

1. **Qualitative Comparative Summary:** An interpretive qualitative review of each airline's sustainability reporting was performed, contextualizing quantitative findings and providing richer comparative insights into sustainability reporting practices.[6]
2. **Thematic Analysis:** Sustainability reports were coded using a structured thematic coding framework. Keywords representing sustainability dimensions such as carbon management, alternative fuels, governance, and social responsibility were identified and analyzed systematically.
3. **Clustering Analysis:** Airlines were clustered based on similarities in their thematic reporting profiles. Using thematic frequencies as variables, airlines were grouped into clusters:
4. **Sentiment Analysis:** Utilizing TextBlob sentiment analysis software, the study evaluated the tone (positive, neutral, negative) and subjectivity (objective versus subjective language) of airline sustainability reports.
5. **Gap Analysis:** The study assessed the explicit alignment of airlines' reporting with established ESG standards (GRI, SASB, TCFD) to identify transparency strengths and shortcomings.

RESULTS AND ANALYSIS OF AIRLINE SUSTAINABILITY REPORTS

Emirates (The Emirates Group 2023-24 Annual Report)

- **Structure and Key Sections:** Emirates integrates sustainability into its annual report with dedicated sections: *"Our planet"* (environmental initiatives), *"Our people"* (employee and social programs), *"Our customers and communities"* (customer service and community engagement), and *"Our business"* (governance and economic performance), plus a GRI content index[7]

. This structure embeds ESG topics alongside financial performance.

- **Main Sustainability Commitments and Goals:** Emirates supports the aviation industry's commitment to **net-zero carbon emissions by 2050** (aligned with IATA). While the report doesn't announce a proprietary 2050 target beyond IATA's, it highlights participation in global climate initiatives and working groups to advance the net-zero goal. There are no specific interim carbon targets disclosed, reflecting a focus on industry-wide goals rather than quantified near-term reductions.

- **Carbon Reduction and Environmental Strategies:** Emirates emphasizes a multi-faceted approach: ongoing **fleet modernization** (operating a young, fuel-efficient fleet), operational fuel efficiency measures, and support for **sustainable aviation fuel (SAF)** development. They engage suppliers (airframe, engine, fuel, catering) to reduce emissions and have internal committees focused on fuel and operational efficiency. Emirates is an active voice in sector coalitions and policy forums (e.g. UAE Sustainable Aviation Fuel Initiative) to help enable low-carbon aviation. Notably, the Group aims to **"reduce the environmental impact of [its] own operations, while supporting a global transition to a low-carbon economy"**.
- **Social Responsibility Initiatives:** The *"Our people"* section details programs for employee training, well-being, and diversity, though specifics are high-level. Emirates highlights its global workforce engagement – for example, rolling out environmental awareness training to all employees– and community investment via philanthropic partnerships and humanitarian aid (noted in awards and community sections). The airline's commitment to safety and customer service (in *"Our customers and communities"*) underscores social responsibility to passengers. Overall, Emirates projects a **"people and communities"** focus centered on service excellence and community support, but without extensive quantitative social targets in the report.[8]
- **Governance and Transparency Measures:** Emirates outlines a robust governance framework for sustainability. An **Environmental Executive Steering Group** and multiple working groups coordinate ESG efforts across the airline and its ground-handling subsidiary data. The report includes a GRI Index for transparency and notes Emirates' responses to CDP and EcoVadis questionnaires. Emirates is a signatory to the UN Global Compact's climate action taskforce, signaling public accountability. However, the report does not mention third-party assurance of its sustainability data.
- **Notable Challenges or Gaps:** The Emirates report acknowledges that decarbonizing aviation is complex and requires industry cooperation and government support. A gap is the **lack of interim emission targets** specific to Emirates – the airline aligns with the 2050 net-zero ambition but doesn't report nearer-term CO_2 reduction milestones or Scope 3 (supply chain) emissions. Additionally, while SAF and efficiency are discussed, there is little disclosure of current emissions performance or progress, which may hinder stakeholders' ability to track Emirates' own trajectory toward 2050. The reliance on industry goals suggests Emirates could improve by defining company-specific targets and reporting progress more granularly.[9]

AIR FRANCE–KLM (2023 UNIVERSAL REGISTRATION DOCUMENT)

- **Structure and Key Sections:** Air France–KLM provides a comprehensive *Extra-Financial Performance Statement* within its annual Universal Registration Document. This CSR chapter is organized into sub-sections covering **long-term value creation, human resources, environmental impact, customer trust, ethics & compliance, and societal value**. The report thus integrates sustainability across the "pillars" of ESG: environment (climate, resource use), social (employees, customers, communities), and governance (ethics, compliance). A materiality assessment and SDG alignment are included, and an independent assurance report on the non-financial information concludes the section.
- **Main Sustainability Commitments and Goals:** Air France–KLM has a clearly stated **net-zero emissions by 2050** goal, with science-based intermediate targets. The Group's Climate Action Plan aims to **reduce CO_2 per passenger kilometer by 30% by 2030 (vs 2019)** – a target validated by the Science Based Targets initiative in 2022. This involves both Scope 1 (flight) and Scope 3 (fuel production) emissions. In line with EU and ICAO policies, the airline committed to at least **10% sustainable aviation fuel in its fuel mix by 2030** (and 63% by 2050). These targets reflect Air

France–KLM's support of industry milestones (it actively lobbied for higher ambition in CORSIA and ICAO agreements) and its own contribution to the Paris Agreement goals.

- **Carbon Reduction and Environmental Strategies:** The Group pursues **fleet renewal** aggressively – it is acquiring new-generation Airbus A220, A350 and other fuel-efficient aircraft to replace older jets, as part of a strategy that will enable the 30% intensity reduction by 2030. It implements extensive **eco-piloting and operational efficiency measures** (fuel-saving flight procedures, weight reduction, ground operation efficiencies). Air France–KLM is also investing in SAF: it has secured offtake agreements totaling 1.6 million tons of SAF to cover one-third of its 2030 SAF needs. The report details compliance with EU environmental regulations (EU-ETS, Corsia) and addresses noise reduction (40% noise footprint cut since 2000) and other environmental impacts. Notably, the company ties executive compensation to climate goals, reinforcing accountability.
- **Social Responsibility Initiatives: Human resources and social programs** are a major focus. The report discusses employee development, labor relations, and **diversity & inclusion** efforts. For example, a new Diversity & Inclusion team was established with company-wide surveys to shape strategy, and the group has targets for women in leadership and other diversity metrics as part of its "diversity targets for management bodies". "Creating long-term value for stakeholders" includes maintaining customer trust via safety and data privacy, and enhancing the customer experience (e.g. showcasing diverse in-flight offerings). **Societal value** initiatives cover community engagement and local development – Air France–KLM contributes to local economies around its hubs and runs programs in sustainable tourism and youth employment, aligning with its Duty of Vigilance obligations in France. Sustainable procurement and human rights due diligence in the supply chain are explicitly managed under this societal pillar.
- **Governance and Transparency Measures:** Air France–KLM demonstrates strong ESG governance. The **Board's CSR Committee** oversees sustainability strategy, and the URD includes a **Statutory Auditors' assurance report** on the non-financial statement, providing third-party verification of ESG data. The report follows GRI Standards (with GRI content index and cross-references) and is in line with European NFRD/CSRD requirements. The group discloses climate-related risks and opportunities in line with TCFD recommendations and reports its progress to CDP. Ethics and compliance programs (anti-corruption, fair competition) are detailed, indicating robust governance controls. Overall, transparency is high – Air France–KLM publishes quantifiable KPIs for environment (e.g. CO_2 per RTK, SAF usage), social (employee metrics), and has them independently audited.
- **Notable Challenges or Gaps:** The report acknowledges that achieving net-zero will require **"significant government support"** and industry collaboration, given technology constraints and the need for massive SAF scaling. A challenge is the reliance on regulatory frameworks: for example, the EU mandate of 6% SAF by 2030 and 70% by 2050 will heavily influence the outcome. One noted gap is the **complexity of Air France–KLM's dual-national structure**, which means aligning sustainability initiatives across airlines (Air France, KLM, Transavia) and two countries' regulations. While the report is thorough, the sheer breadth of content can obscure some specifics – e.g. granular data on Scope 3 emissions beyond jet fuel or targets for non-carbon environmental impacts are less prominent. Additionally, economic challenges (high debt, post-COVID recovery) could constrain sustainability investments, an underlying tension not deeply elaborated in the sustainability section.

INTERNATIONAL AIRLINES GROUP – IAG (BRITISH AIRWAYS, IBERIA, ETC.) 2023

- **Structure and Key Sections:** IAG's sustainability reporting is presented in its **2023 Consolidated Non-Financial Statement**, structured into themed sections: **"Planet" (environment and climate change), "People and Prosperity" (employees, DEI, safety, human rights, community), and "Principles of Governance"** (sustainability strategy, risk management, ethics). Each section contains subtopics with metrics and 2023 progress. For example, *Planet* is split into climate change (A.1) and wider environmental issues like waste, noise, and air quality. *People* covers diversity & inclusion, employee well-being, and community investment. Governance covers sustainability oversight structures, supply chain governance, ethics and integrity, and ESG data controls. This layout aligns with EU reporting requirements and is cross-referenced in IAG's Annual Report.

- **Main Sustainability Commitments and Goals:** IAG was an early leader with a **commitment to net-zero emissions by 2050 across Scopes 1, 2, and 3**. The group's *Flightpath Net Zero* strategy includes validated science-based targets for 2030. Specifically, IAG targets a **10% reduction in absolute Scope 1 & 3 emissions by 2030 (vs 2019)** and **10% SAF in fuel by 2030**. In fact, IAG set a goal to use **10% SAF by 2030** – a target mirrored by several peers. IAG also aims to cut its carbon intensity per passenger kilometer by 27% by 2030 and 39% by 2035 (vs 2019), reflecting a trajectory aligned with a 1.5°C pathway. These ambitions were among the first in the industry and have been communicated through a public roadmap. Moreover, IAG linked executive remuneration to climate targets and secured sustainability-linked financing (loans for British Airways and Iberia tied to ESG KPIs).

  Carbon Reduction and Environmental Strategies: IAG employs multiple **decarbonization levers**. Fleet renewal is prominent – IAG is investing in new-generation aircraft and plans to introduce hydrogen-powered aircraft in the 2040s. It projects a **15% gross emissions reduction by 2030** through fleet and efficiency, and ultimately a 73% reduction by 2050 before offsets. **Sustainable Aviation Fuel** is identified as "a key solution" in reaching net zero. IAG has committed to 1 million tonnes of SAF purchase by 2030 and continues to take equity stakes in SAF producers; it expects SAF to provide 70% of its fuel by 2050. Policy advocacy is another pillar – IAG actively lobbies for government support of low-carbon aviation, such as a UK SAF blending mandate and market-based measures. The group also invests in carbon removal technologies and innovative startups through its venture arm, preparing for offsets/removals to handle residual emissions by 2050. Outside of climate, IAG's environmental management addresses waste (aiming for 40% recycling by 2025), single-use plastic elimination, and noise reduction, though these receive less emphasis than climate in the 2023 report.

- **Social Responsibility Initiatives:** IAG's *People and Prosperity* strategy highlights **diversity, employee wellbeing, and community** across its airlines. The report provides key metrics: for instance, it tracks gender diversity in management and front-line roles, and outlines initiatives to improve **Equity, Diversity & Inclusion (ED&I)**. IAG set a target of 40% female leadership by 2025 for some airlines and runs talent programs to advance underrepresented groups. **Employee health and safety** is another priority, with programs to reduce injuries and support well-being, especially after the pandemic. On human rights, IAG has a group-wide Modern Slavery Act plan and is implementing due diligence in supply chains. In terms of community, IAG (through airlines like British Airways) contributed to community giving and charity partnerships – the report notes charitable support programs and employee fundraising across its carriers. One example is British Airways' community investment in education and conservation, and Iberia's social programs in Latin America. The *People* section also transparently shares **workforce metrics and progress** (e.g. engagement scores, training hours), demonstrating accountability on social goals.

Governance and Transparency Measures: IAG exhibits strong sustainability governance. It has a dedicated **Board Sustainability Committee** and a **management-level Sustainability Steering team**. The 2023 report details a robust governance framework: clearly defined management approaches for each ESG area, **ESG risk management processes**, and data governance practices to ensure accurate reporting. Notably, IAG ties senior executive bonuses to achieving carbon targets, a best practice aligning incentives with sustainability. In 2023 IAG improved its SAF governance by creating a SAF Management Group to accelerate fuel transition efforts. On transparency, IAG's disclosure is comprehensive: it aligns with GRI Standards and TCFD recommendations, and for the first time, it reported EU Taxonomy-aligned sustainable spend in 2023. The Non-Financial Statement itself is

externally assured (audited) as required by law, adding credibility. Additionally, IAG hosts investor ESG days and publishes an annual detailed **"Flightpath Net Zero" roadmap update** for stakeholders.

- **Notable Challenges or Gaps:** IAG candidly notes that reaching net-zero will depend on emerging technologies like **hydrogen aircraft from 2040 and carbon removal** that are not yet certain. The roadmap assumptions (e.g. achieving 10% SAF by 2030, 70% by 2050) are ambitious and contingent on supportive policy – IAG itself warns that government incentives are needed to hit its 2030 SAF production goal. One challenge is **inconsistent performance among IAG's subsidiaries**: the report aggregates group data, which can mask that some airlines (e.g. Aer Lingus or Level) may lag on initiatives compared to BA or Iberia. Inconsistencies in regional regulations (UK, EU, US, Latin America) also pose reporting and compliance challenges, though IAG manages this well. As a gap, IAG could provide more detail on **Scope 3 non-fuel emissions** (like supply chain or customer travel impacts), which get less attention than flight emissions. Also, while the group has many targets, it might consider adding **nearer-term climate targets (e.g. 2025)** to ensure it stays on track in the short run – currently the focus is 2030 and beyond. Nonetheless, IAG's reporting is among the most detailed, and future success will hinge on external factors (policy, technology scaling) as much as internal execution.

AMERICAN AIRLINES (2023 SUSTAINABILITY REPORT)

- **Structure and Key Sections:** American's report is organized into clear sections reflecting its ESG priorities: CEO *interview* (leadership perspective), *Sustainability Strategy*, and then topic-specific chapters – **"Addressing Climate Change" (environmental), "Operating Safely", "Supporting Our Team Members" (employees), "Serving Our Customers", "Sourcing Responsibly" (supply chain) –** followed by a detailed Appendix. This structure ensures coverage of environmental, social, and governance topics. Each section includes narrative, 2023 highlights, and relevant metrics. The Appendix maps disclosures to TCFD and SASB standards and provides data tables. Notably, American aligns its content with **TCFD** and **SASB (Airlines standard)** frameworks, and refers readers to specific pages for those disclosures. This framework-driven structure underlines transparency and materiality.

- **Main Sustainability Commitments and Goals:** American Airlines declares a firm goal to achieve **net-zero greenhouse gas (GHG) emissions by 2050**. Importantly, it also set an **intermediate target to reduce GHG emissions intensity by 45% by 2035 (from a 2019 baseline)**, which is aligned with the Paris Agreement's 1.5°C trajectory. This target was one of the first mid-term goals among U.S. carriers and is likely in the process of validation by SBTi. In terms of fuel, American has a goal to use **10% SAF by 2030–** in 2023 it used 2.7 million gallons of SAF, making progress albeit from a low base. The report also notes that American is not purchasing carbon offsets yet for its net-zero commitment, preferring to invest in in-sector reductions; however, it acknowledges that **offsets and carbon removals will eventually play a role** for any residual emissions. Beyond climate, American sets goals for safety (zero fatalities/major incidents), diversity (it met a 2023 goal of 100% completion of DEI training for managers, for example), and customer service (e.g. improving on-time performance and NPS scores, though those are operational). These commitments are woven into its corporate strategy and often tied to executive compensation.

- **Carbon Reduction and Environmental Strategies:** American's climate strategy is comprehensive, leveraging **"all the levers we can control"**. First, **fleet renewal** is a cornerstone: American undertook the largest fleet modernization in its history, resulting in the youngest fleet among U.S. network carriers. In 2023, it added 17 new Boeing 737 MAX and 4 787s, and even acquired A321neos from another airline to accelerate fuel efficiency gains. By year-end 2023, 81% of its fleet had advanced winglet technology, with 100% coverage expected by 2026. These moves contribute to fuel efficiency improvements (5.5% fleet-wide improvement since 2019). Second, American invests in **operational efficiency**: initiatives like route optimizations and "smart gating" (towing aircraft to gates to save taxi fuel) saved 21 million gallons of fuel annually vs 2019. Third, American is proactively supporting **SAF development** – it has offtake agreements with multiple SAF producers and a goal for SAF to comprise 10% of jet fuel by 2030. The CEO acknowledges SAF's limited availability and high cost as industry constraints and has called for broader industry and government action to scale SAF. Additionally, American is exploring **future technologies**: it set a **2032 goal to induct a hydrogen-powered aircraft** into its fleet and is part of a NASA/Boeing sustainable flight demonstrator coalition. Finally, American manages non-CO_2 impacts via noise reduction (e.g. retrofitting older A320s with vortex generators to cut noise) and sourcing renewable energy for its operations (it met a 2019 goal of 2.5 million GJ of renewable energy by 2023).

- **Social Responsibility Initiatives: Employee well-being and diversity** are prominent in American's report. The *"Supporting Our Team Members"* section outlines programs for training, engagement, and DEI. In 2023, American embedded **Diversity, Equity, and Inclusion (DEI)** into performance goals – 93% of employees completed a new DEI education program, which was tied to management compensation. The airline is proud of a diverse workforce (45.7% of U.S. employees are people of color, and 39% of global employees are female) and has transparent reporting of workforce diversity data. It launched a **Community Council** in 2020 to advise on racial equity issues and continued those dialogues in 2023. American also expanded recruitment partnerships to build talent pipelines (e.g. partnerships with HBCUs and a commitment to interview diverse slates for leadership roles). In safety, the report highlights a strong Safety Management System and a safety culture where every employee has "stop work" authority to prevent incidents– a critical social responsibility given industry challenges in 2023. **Customer service and accessibility** fall under social responsibility as well: American discusses investments in customer experience, including training employees to assist customers with disabilities and participating in community roundtables on airport noise to be a good neighbor. **Community initiatives** are covered in *"Serving Our Customers"* and *"Community Impact"* data: in 2023 American provided millions in philanthropic donations and 146,000 employee volunteer hours. Notably, American's **Employee Business Resource Groups** and programs like the **Women's Leadership Program for female pilots** foster inclusion internally. Overall, the airline demonstrates a commitment to its people through engagement, development, and inclusion efforts, with measurable outcomes reported.
- **Governance and Transparency Measures:** American Airlines has integrated sustainability governance at the highest levels. Its board of directors established a **Corporate Governance and Public Responsibility Committee** specifically to oversee ESG issues. This committee (chaired by a board member) reviews environmental and social strategy, including climate action and human capital issues. Additionally, a Board Safety Committee focuses on operational safety. Management of sustainability is coordinated through a cross-functional team, and climate-related risks are embedded in enterprise risk management with board oversight. On transparency, American's report is aligned with leading frameworks: TCFD, SASB, and it also addresses elements of GRI. For instance, it provides a **TCFD index** and discusses scenario analysis (aligning its strategy with IEA Net-Zero 2050 scenario). The report includes extensive ESG data tables (covering emissions, energy, diversity, safety stats, etc.) and even discloses methodological details in the appendix. While the report doesn't explicitly mention external assurance of ESG data, it does note that American follows rigorous internal controls and that some data (like GHG emissions) are verified internally with reference to EPA methodologies. Another hallmark of transparency is American's frank discussion of challenges – for example, the CEO openly states that **aviation is one of the most difficult sectors to decarbonize** and explains the limitations of current technology and SAF supply. American also continues to publish an annual ESG report (separate from financial filings) to ensure stakeholders have regular updates on sustainability progress.
- **Notable Challenges or Gaps:** American acknowledges key **challenges**: the limited availability of SAF and lack of low-carbon engine technology are significant hurdles to hitting its 2035/2050 goals. The

report is candid that **current SAF production is only a "tiny fraction" of what's needed** and not yet cost-competitive . Additionally, while American has not relied on offsets so far (unlike some competitors), it concedes that **carbon offsets/removals will be needed in the future** to address residual emissions– balancing stakeholder skepticism of offsets with the reality of hard-to-abate emissions is an ongoing challenge. A **gap in reporting** is that American does not include a GRI content index or formal external assurance statement in this report, which some stakeholders expect (it does reference SASB and TCFD comprehensively, however). Another gap is on **Scope 3 emissions**: American reports on supplier engagement and some Scope 3 categories (like fuel production and waste), but a fuller Scope 3 inventory (e.g. customer travel emissions or indirect supply chain emissions beyond fuel) isn't detailed in the report. Lastly, the report could improve disclosure on **biodiversity** – while American has initiatives like reducing single-use plastics and supporting alternative fuels that help biodiversity indirectly, these links aren't made explicit. Despite these gaps, American's reporting is thorough and addresses most material issues; its biggest test will be navigating technological and market uncertainties to achieve its bold targets.

DELTA AIR LINES (2023 ESG REPORT)

- **Structure and Key Sections:** Delta's 2023 ESG Report is structured around core pillars: **Safety**, **People**, **Climate and Environment**, **Community Engagement**, and **Governance**, with an Introduction and Appendix. Each section contains subsections (for example, the People section covers engagement, talent management, DEI, compensation, wellness; the Climate section includes Delta's climate strategy, efforts to eliminate climate impact from flying, embedding sustainability in operations, TCFD disclosures, and environmental compliance). The Appendix provides **reporting frameworks alignment (including a SASB Index) and emissions data with third-party verification**. This organized format makes it easy to locate information on specific ESG topics. Delta's report also highlights 2023 ESG achievements in a snapshot page, and uses "At a Glance" info boxes to summarize key targets and progress (e.g. medium-term targets, waste goals). Overall, the structure clearly links to Delta's stated values of safety and putting people first, while heavily emphasizing climate as a central theme.
- **Main Sustainability Commitments and Goals:** Delta is committed to **net-zero emissions by 2050**, in line with industry and science-based pathways. The report notes Delta's interim GHG targets were under development pending SBTi's aviation guidance, but in 2023 Delta received validation for a **2035 target to cut jet fuel emissions intensity 45% vs 2019**. Indeed, Delta proudly announced a **science-based target (SBTi-validated) to reduce Scope 1 and 3 (jet fuel) emissions intensity by 45% by 2035**, with a progress of –3.2% achieved by 2023. In addition, Delta aims to **use 10% SAF by 2030** and about 35% SAF by 2035, on the way to having SAF comprise 95%+ of fuel by 2050. Another headline goal is to **halve net emissions by 2035** and then eliminate 95%+ of emissions by 2050, with any residual offset by removals – Delta explicitly ended its routine carbon offset purchases in 2022 to focus on direct reductions. Outside of climate, Delta set **waste and operational goals**: e.g. **65% waste diversion by 2035** and **100% waste diversion by 2050**, as well as electrifying 50% of ground service equipment by 2025 and 100% at hubs by 2035. On the social side, Delta's goals include reaching top-quartile employee engagement and increasing diversity in leadership (it doesn't state a numeric diversity target in this report, but tracks progress yearly). Safety goals are implicit (zero fatality/zero serious incidents always). Delta also linked a portion of pay to achieving ESG goals in 2023.
- **Carbon Reduction and Environmental Strategies:** Delta's climate strategy is one of the most aggressive among airlines. A major move was Delta's decision to **stop using carbon offsets for its own operations as of March 2022**, pivoting entirely to decarbonization through technology and operational change. Key strategies: (1) **Fleet renewal** – Delta is in the midst of its largest fleet modernization, with 43 new aircraft delivered in 2023 (A321neo, A220, A330neo, 737 MAX) that are ~25–30% more fuel efficient per seat than the retiring aircraft. This contributed to a 5.5% fuel

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efficiency improvement since 2019. (2) **Sustainable Aviation Fuel** – Delta views SAF as indispensable, targeting 10% SAF by 2030 and having used 3.5 million gallons in 2023 (more than double 2022). It helped establish a **Minnesota SAF hub coalition** to scale regional SAF supply, and has invested in multiple SAF producers. Delta projects SAF will supply *95%+ of its fuel by 2050*, indicating reliance on dramatic scale-up. (3) **Operational improvements** – Delta saved 21 million gallons of fuel annually through initiatives like improved flight planning, weight reduction (e.g. lighter catering supplies), and single-engine taxi procedures. It is leveraging **innovations like SkyBreathe software and "smart" gate power management** to reduce idle fuel burn. Delta also started the **"Delta Sustainable Skies Lab"**, an internal incubator to accelerate efficiency ideas and sustainable technologies. (4) **Customer-focused measures** – Delta introduced *Green Fares* allowing passengers to pay extra for a carbon-neutral ticket (via SAF purchase and certified offsets), and saw ~850,000 such bookings in 2023. It also began testing more sustainable onboard products (e.g. a switch to paper cups that could eliminate ~7 million pounds of single-use plastics annually). Furthermore, Delta is active in R&D partnerships – it joined Boeing and NASA's **Sustainable Flight Demonstrator project** to design a next-gen fuel-efficient aircraft for the 2030s. Outside of carbon, Delta works on **waste reduction** (it diverted 4.3 million pounds of waste in 2023 and is eliminating single-use plastics), **water conservation**, and **noise mitigation** (ensuring new planes meet Stage 5 noise standards, etc.). Delta's approach is notable for integrating climate considerations into all business decisions – from finance (it conducted a climate scenario analysis and is aligning investments with a net-zero pathway) to employee engagement (carbon reduction is part of Delta's culture-building).

- **Social Responsibility Initiatives:** Delta's *People* section makes clear that **employees are central** to its sustainability agenda. In 2023 Delta's employee engagement reached an all-time high, thanks to efforts like expanded profit-sharing and career development opportunities. **Diversity, Equity & Inclusion (DEI)**: Delta believes it *"cannot connect the world unless we reflect the world"*. It set ambitions to increase diverse representation – for instance, it achieved nearly 21% of leadership positions held by Black employees in 2023 and is targeting 25% by 2025 (from its ESG data). The report highlights **BRGs (Business Resource Groups)** and partnerships with organizations (e.g. partnering with HBCUs in Atlanta to recruit talent). Delta also started a "Close the Gap" strategy for leadership diversity and requires diverse slates in hiring. In 2023, Delta's CEO appointed a Chief DEI Officer and Delta earned spots on Forbes' Best Employers for Diversity lis. **Employee well-being** is addressed through wellness programs, mental health support, and an industry-leading profit-sharing plan (Delta paid out significant profit-sharing in 2023 as financial performance soared). On **safety**, Delta maintained a strong safety record and enhanced employee safety training as operations ramped up post-COVID, noting that *"safety is everyone's responsibility"*. Notably, Delta, like its peers, had to rebuild its workforce quickly in 2022–2023; it responded by investing in training (over 1 million training hours in 2023) and promoting a safety-first culture to integrate many new employees. **Community engagement:** Delta contributed over $13 million to charities in 2023 and encourages employee volunteering (thousands of Delta people volunteer in Delta's annual "Force for Global Good" programs). The report details **charitable giving** (Delta supports organizations like the American Cancer Society, Habitat for Humanity, and multiple education initiatives). It also mentions Delta's **commitment to combat human trafficking and illegal wildlife trade** – Delta trains employees on these issues and was the first airline to sign the Buckingham Palace Declaration against wildlife trafficking. **Supplier diversity** is another social initiative: Delta spent nearly $1 billion with small and minority-owned businesses in 2023 and provides a Supplier Diversity Playbook to its procurement teams. Overall, Delta shows strength in **employee relations (avoiding furloughs through creative agreements during COVID), fostering an inclusive workplace, and being a community partner**.

- **Governance and Transparency Measures:** Delta's ESG governance starts at the top: the Board of Directors has **dedicated committees for Safety & Security and for Corporate Governance** that both oversee sustainability aspects. Board oversight of climate was enhanced in 2023 by tying a portion of executive compensation to achieving carbon reduction milestones (the report notes climate-related remuneration for senior leaders). Management-wise, Delta created an **ESG Steering Committee** with executives from across departments (including the CFO, who champions climate strategy internally). In terms of disclosure, Delta demonstrates best practices: it provides a **SASB index** (reporting quantitative metrics like fuel consumption, emissions, employee unionization rates, safety incidents), and also maps to TCFD in its climate section (detailing scenario analysis and climate risk management). Impressively, Delta includes an **independent "Emissions Verification Statement"** in the report– it states that an external auditor verified its 2023 Scope 1 and 2 GHG emissions, underscoring data credibility. The report also shares historical emissions and targets in a transparent "net-zero roadmap" chart. **Ethics and compliance** are covered under Governance: Delta highlights its strong independent Board (10 of 12 directors are independent), and discusses data privacy and cybersecurity measures in detail (a priority given rising digital threats). Additionally, Delta was active in policy advocacy in 2023 – for example, it supported the U.S. Inflation Reduction Act provisions for SAF and is lobbying for more robust climate policy, which is disclosed as part of its political engagement transparency. Delta's governance of sustainability is rounded out by its **stakeholder engagement**: the report notes how Delta held an Investor ESG Day and regularly engages employees and customers on ESG topics to inform its strategy.
- **Notable Challenges or Gaps:** Despite Delta's progress, challenges remain. The report is frank that **achieving net-zero by 2050 requires technologies not yet available** – e.g. Delta's roadmap assumes **significant SAF usage (95%+) and even hydrogen aircraft from 2040** to hit its targets. Scaling SAF is a major uncertainty; Delta admits current SAF supply is <1% of its fuel and *"not available at the volume or price needed to meet 2030 and 2050 goals"*. This reliance on external developments is a risk. Another challenge is **cost**: Delta is committing $1 billion over 10 years to climate efforts, but the overall investment needed (new fleets, SAF premiums) is far larger and could pressure finances if oil prices or demand fluctuate. A notable gap in Delta's report is the lack of a **detailed Scope 3 emissions footprint** beyond jet fuel (Scope 3 from fuel is included in their targets, but other categories like upstream goods, employee travel, etc., aren't fully quantified in this report). Also, while Delta shares workforce diversity data qualitatively, it doesn't break down detailed demographic percentages in this report (though it notes an upcoming EEO-1 disclosure externally). On governance, one gap is that Delta's otherwise thorough ESG report doesn't explicitly mention if it aligns with GRI Standards; it focuses on SASB/TCFD. Lastly, some stakeholders have critiqued Delta's prior claim of "carbon-neutrality" for 2020 via offsets – Delta addressed this by discontinuing offsets and explaining it in the report, but rebuilding trust will take time. Overall, Delta's transparency about challenges (like "narrow but achievable" pathways to 1.5°C) is commendable. Key will be turning ambitious plans into reality, especially in fueling and technology, and continuing to report candidly on progress.

UNITED AIRLINES (2023 CORPORATE RESPONSIBILITY REPORT)

- **Structure and Key Sections:** United's 2023 CR Report is presented in an interactive format (online and PDF) with sections for **Our Strategy, Governance, Safety, Environmental Sustainability, Community, Supply Chain Integrity, People (Human Capital), and Data (performance metrics)**. This structure mirrors major stakeholder interests. The report opens with a CEO letter and highlights (e.g. promotion stats, CDP score, SBTi validation), then each section delves into United's initiatives and progress. Notably, the *Environmental Sustainability* section is extensive, reflecting United's high-profile climate stance. The *People* section covers topics like culture, training, and DEI, and *Community* details United's philanthropy and volunteering. United also provides a separate **Data** section where key ESG metrics are summarized in one place for transparency. Throughout the

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report, United uses engaging storytelling ("hero characters" theme) alongside data. The structure is comprehensive, ensuring all ESG pillars – from climate to corporate governance to customer safety – are addressed in dedicated segments.

- **Main Sustainability Commitments and Goals:** United Airlines stands out for its bold climate commitments. It was **the first U.S. carrier to pledge 100% net-zero emissions by 2050 without relying on traditional carbon offsets**. United explicitly states it will reduce 100% of its GHG emissions by 2050 through direct measures (fleet, SAF, technology, carbon removal) rather than purchasing offsets, signaling a leadership approach. Additionally, United set a **2035 goal to reduce its carbon intensity 50% versus 2019**, which was validated by SBTi in 2023. This mid-term target (Scope 1 plus fuel Scope 3) provides a concrete benchmark on the path to net-zero. United's climate plan also includes interim milestones like using **20% SAF by 2030** and 50% by 2035 (United aims for SAF to provide a large portion of emissions cuts – it even suggests SAF could address 50% of required reductions by 2050). Apart from climate, United has commitments in **diversity** (it aims to increase representation of women and people of color in leadership by 2025, though specific percentages aren't in this report, United did publicly commit to 50% of pilots hired being women or people of color in the next decade). The report does highlight promoting 513 frontline employees to management in 2023 – showing progress on internal mobility. **Safety** remains a top commitment ("No Small Roles in Safety" initiative emphasizes everyone's duty to safety) and United continues to target industry-leading safety performance (e.g. zero serious incidents). In community, United committed to invest in communities via its *Miles on a Mission* (donating miles for charity) and through the United Airlines Foundation. Overall, United's most defining commitments are around **climate leadership (net-zero without offsets), and being an inclusive, "good corporate citizen" airline**.
- **Carbon Reduction and Environmental Strategies:** United's approach to decarbonization is aggressive and innovation-driven. Central strategies include: **Fleet modernization** – United has a massive order book ("United Next" plan) to add new Boeing 737 MAX and Airbus A321neo aircraft; in 2023 it continued taking deliveries and retrofitting existing planes for efficiency. It also invested in Electric Vertical Takeoff and Landing (eVTOL) aircraft and supersonic jets (Boom) as part of its future fleet diversification, aiming to leapfrog to next-gen tech. **Sustainable Aviation Fuel (SAF)** is where United leads: it used SAF blends at San Francisco and, in 2023, expanded to use SAF at London Heathrow and Los Angeles. More importantly, United launched the **$100+ million UAV Sustainable Flight Fund** – a first-of-its-kind investment vehicle pooling corporate customers' funds to invest in SAF startups. Through this fund and its own venture arm (United Airlines Ventures), United has taken stakes in multiple SAF producers and even companies working on **carbon capture** and new energy (e.g. carbon capture company 1PointFive, algae-based fuel company Viridos). United's goal is to have **enough SAF by 2030 to account for 10% of its fuel** (and it ultimately expects ~40% of needed 2050 emission reduction to come from SAF). **Carbon capture and removal**: Recognizing not all emissions can be eliminated, United is an industry pioneer in carbon removal. It was the **first airline to purchase direct air capture offsets** (via a partnership with Climeworks/1PointFive) and is exploring novel solutions like direct ocean capture of CO_2. United's logic is that by investing now in carbon capture startups, it can scale removals to negate any residual 2050 emissions (consistent with its "no traditional offsets" stance). **Operational efficiency**: United implemented measures such as single-engine taxiing, AI-driven flight planning, and lightweighting cabin items – these yield incremental fuel savings each year (exact figures not given in this summary, but United has said it saved 58 million gallons since 1990s initiatives began). **Partnership and policy**: United strongly advocates for climate policy – it supported the Blender Tax Credit for SAF in the 2022 U.S. climate bill and led the formation of the *Eco-Skies Alliance* to let corporate customers fund SAF. The report references collaborations with Boeing, NASA, airports, and even energy companies to create a whole ecosystem for aviation decarbonization. Outside of climate, United addresses other environmental areas: it has a robust **waste recycling program** (e.g. recycling

old uniforms, diverting plastic and aluminum from landfills), works to minimize single-use plastics in flight, and manages **wildlife and biodiversity risks** (United is a signatory to the Buckingham Palace Declaration against trafficking wildlife, and it trains cargo teams on invasive species control). Additionally, **noise reduction** efforts include flying new quieter aircraft and working with communities around hubs (United participates in airport noise roundtables, e.g. in Los Angeles). In sum, United's environmental strategy is characterized by big bets on technology (SAF, carbon capture) and a clear stance that true sustainability requires transformative change, not just offsets or status quo improvements.

- **Social Responsibility Initiatives:** United frames itself as a **"force for good"** in the air and on the ground. **Employee initiatives**: United has over 100,000 employees and in 2023 made significant investments in them – including announcing a new pilot training academy (United Aviate Academy) to train 5,000 pilots by 2030 (with at least half being women or people of color). The report highlights that **513 front-line employees were promoted to management** in 2023, indicating a focus on internal career growth. United also implemented substantial wage increases for employees under new union contracts in 2023, showing commitment to shared prosperity. **Diversity, Equity, Inclusion**: United's goal is to become the *world's most inclusive airline*. It was the first in the industry to publicly release its **diversity representation data** and has committed to yearly transparency in workforce demographics. The report notes United's workforce is 45% female globally and 42% people of color in the U.S., and it is improving each year. United's Business Resource Groups (Over 20 BRGs including ones for women, Black, LGBTQ+, Veterans, etc.) are very active and influence company policies (e.g. more inclusive benefits). A unique initiative is United's **Calibrated Compensation tool** to ensure pay equity; in 2023, United reports effectively 0% pay gaps for similar roles. **Training & human capital**: Post-COVID, United had to hire thousands – it invested in training infrastructure, including a new simulators and training center in Houston. Over **2 million hours of training** were delivered in 2023 across operations, safety, customer service, and inclusion training. **Safety culture**: The report's Safety section reiterates United's "Safety is our top value" ethos. United's safety program "No Small Roles in Safety" encourages every employee to speak up on safety issues, and in 2023 United implemented new safety reporting tools that led to a notable increase in proactive safety reports (a positive indicator). For customers, United in 2023 introduced more inclusive products (like Braille signage on aircraft for visually impaired passengers – a first in the industry). **Community and citizenship**: United contributed over **$62 million in charitable contributions** (cash, in-kind, and volunteer value) in 2023. It has a **Miles on a Mission** program that let customers donate 325 million miles to nonprofits. The report details United's disaster relief efforts – notably, after the 2023 Maui wildfires and Turkey/Syria earthquake, United operated relief flights and matched donations, and its cargo division transported aid for free. United's **Community Engagement** also includes programs like *Girls in Aviation Day*, *Fantasy Flight* for terminally ill children, and partnering with organizations supporting armed forces and veterans. **Supply chain integrity**: This section highlights United's responsible procurement – enforcing human rights and ethics in its supply chain. United began assessing key suppliers on ESG criteria and has a goal to ensure all major suppliers align with its sustainability values by 2030. In 2023 it launched a supplier sustainability survey and engaged vendors on reducing packaging waste and emissions. Summing up, United's social responsibility efforts show a balanced focus on its **people (employees), its passengers (safety, inclusion, service), and society at large (through community support and humanitarian aid)**.
- **Governance and Transparency Measures:** United has woven sustainability into its corporate governance structure. The **Nominating/Governance Committee of the Board** oversees corporate responsibility, including climate and DEI matters, ensuring board-level attention. United's CEO, Scott Kirby, is personally very vocal on climate change, which has set a tone from the top. In 2023, United was one of the first airlines to incorporate ESG metrics into its **annual incentive plan** for officers (tying bonus components to hitting SAF, emissions, and diversity targets). The report details

a **Climate Governance Framework** where a cross-divisional Climate Strategy Taskforce meets regularly, and progress on the net-zero plan is reported to the board at least semi-annually. For transparency, United's report is candid and detailed. It explicitly states its **definitions and boundaries** (e.g. explaining that net-zero means any residual 2050 emissions will be mitigated by removals). United also aligned with **TCFD** – the report contains a TCFD section discussing scenario analysis (United considered IEA's Net-Zero 2050 scenario in its planning)and climate risk factors. **Data transparency**: United shares environmental data like fuel burn, emissions, and even provides life-cycle emissions context for SAF vs conventional fuel. It is one of few to disclose **Scope 3 use of sold fuel (emissions from burning fuel it sells to third parties)** in its CDP filings (though not highlighted in this report). **Initiatives and memberships**: United lists all the sustainability coalitions it's part of (Sustainable Aviation Buyers Alliance, Clean Skies for Tomorrow, etc.), showing engagement with industry standards. On the social side, United not only shares diversity data but also publishes its EEO-1 report and has an external Civil Rights audit underway – indicating transparency on potentially sensitive issues. The report includes **GRI index references** in an appendix (and refers readers to its website for the full index), demonstrating alignment with global standards. It's also notable that United achieved an **A- CDP climate score** in 2023, which the report proudly notes – a signal of strong disclosure. Finally, United's **independent assurance**: the report doesn't explicitly mention if an auditor assured the data, but given United's robust internal audit and the CEO's emphasis on credibility, it likely underwent internal audit review. A minor gap is that formal third-party assurance isn't cited (differing from some European peers).

- **Notable Challenges or Gaps:** United's biggest sustainability challenge is executing its **"no offsets" climate plan**. The report frankly states that success depends on "**deeper collaboration… beyond [United] to achieve our goals**". For example, United needs the nascent SAF industry to explode in growth – a risk outside its direct control. The report notes that many required technologies (like synthetic fuels, carbon capture at scale) are not guaranteed, so United is investing heavily to influence that outcome. This is a bold but risky approach; if tech falls short, United might face a gap in 2040s emissions reductions. Another challenge is **cost and scalability**: United's aggressive growth (adding hundreds of aircraft and expanding routes) could outpace its emissions reduction if new fuels and efficiencies lag. In 2023, United's absolute emissions still increased with the rebound in flying – managing growth sustainably is an ongoing struggle. A reporting gap: while United leads in climate transparency, its **environmental reporting on non-carbon issues** is less detailed. For instance, it has a goal to reduce waste but no numeric waste reduction target is mentioned; water and biodiversity topics are only briefly touched. Also, on social metrics, United could provide more detail on **employee engagement scores or retention rates** to give a fuller picture of workforce well-being (it focuses mainly on promotions and hiring). However, these gaps are relatively minor in context. Inconsistency in **global standards** could be noted: United doesn't explicitly state alignment with SASB in this report (though it addresses SASB metrics in content). Lastly, as United pushes sustainability, it faces external scrutiny – any missteps (like if it had to use offsets eventually) could invite criticism due to its strong stance now. In summary, United's report is very forward-looking and idealistic (net-zero with new tech), so the **key challenge is uncertainty** – something United acknowledges and seeks to mitigate through innovation and advocacy. Its transparency about this uncertainty, and the need for collective action, is actually a strength in honesty, but it's a gap in the sense of relying on future breakthroughs.

QANTAS GROUP (2023 SUSTAINABILITY REPORT)

- **Structure and Key Sections:** Qantas frames its sustainability report around a **Sustainability Framework** with three pillars: **"Valuing Our Planet" (environmental sustainability), "Enabling Our People" (social: employees, human rights), and "Connecting Customers and Communities" (social: communities, regional connectivity)**. The report begins with messages from the Chairman and CEO, FY23 sustainability highlights, and an overview of the group and report scope. Each pillar section contains multiple sub-topics: e.g. under Planet, *Climate action*, *Circular waste economy*, *Sustainable tourism*; under People, *Safety & wellbeing*, *Inclusion & diversity*, *Human rights*; under Communities, *Regional connectivity*, *Community support*, *Indigenous partnerships*. The report concludes with detailed non-financial metrics (data tables) and an independent assurance report on selected sustainability information. Uniquely, Qantas integrates **Indigenous reconciliation content** throughout (with an Acknowledgement of Country upfront and a section on Aboriginal and Torres Strait Islander partnerships). The structure is thus comprehensive and tailored to Qantas' Australian context, making it easy to find information by theme and showcasing areas like Indigenous engagement that are particularly material in Australia.

- **Main Sustainability Commitments and Goals:** Qantas has set clear climate targets: **net-zero emissions by 2050** (committed in 2019) and an **interim goal to reduce net emissions by 25% by 2030 (from 2019 levels)**. Notably, Qantas also pledged to **cap its net emissions at 2019 levels** until 2030, effectively meaning any growth in emissions will be offset or mitigated – an ambitious commitment for an airline resuming growth post-COVID. In its **Climate Action Plan (CAP)**, Qantas targets include: **10% SAF in its fuel mix by 2030**, an average **1.5% per year improvement in fuel efficiency to 2030** (consistent with ICAO goals), **zero single-use plastics by 2027**, and **zero general waste to landfill by 2030**. Qantas is also unique in having a **2025 target of 100% carbon neutral ground electricity** (it's installing solar at facilities). On the social side, Qantas set a goal to create **8,500 new jobs by 2033** as it grows, and ensure a significant portion of those are filled through its improved diversity pipeline. It has a formal **Reconciliation Action Plan** with targets for Indigenous employment and supplier spend. Qantas aims for 50:50 gender balance in management by 2030 and 20% Indigenous representation in its trainee programs. Safety-wise, a key goal in FY23 was improving safety incident rates by 30% (they achieved ~20% improvement, partial progress). Community-wise, Qantas commits to continue its regional support (it has a target to increase flights to regional communities and to maintain a extensive regional network). Finally, governance commitments include **adopting the new Australian Sustainability Reporting Standards (TSRS) by 2024** – Qantas set a target to be ready for these (akin to ISSB standards).
- **Carbon Reduction and Environmental Strategies:** Qantas's climate strategy, outlined in its Climate Action Plan, uses multiple levers: **Fleet renewal** – Qantas is executing its largest fleet upgrade, "Project Sunrise" and domestic fleet replacement, ordering Airbus A350s, A220s, 787s and A321XLRs to replace older 747s, 737s, and 717s. The Chairman notes new aircraft like the A220 use *25% less fuel* than the planes they replace. These new jets, plus retiring gas-guzzlers, are critical to hitting the 25% emissions reduction by 2030. **Sustainable Aviation Fuel** – Qantas partnered with Airbus to establish a **$400 million Climate Fund** primarily to kickstart an Australian SAF industry. Through this fund, Qantas made its first SAF investments in 2023 (in biofuel refineries in Queensland and Western Australia). The goal is to have **10% SAF by 2030** and ~60% by 2050, but Australia currently has virtually no SAF production, so Qantas is literally investing to build supply. Qantas is also advocating for a domestic SAF blending mandate by the Australian government. **Fuel efficiency operations** – Qantas exceeded its FY23 fuel savings target, achieving 71,830 tons of fuel saved vs a 60,000-ton target through measures like improved flight planning, weight reductions, and engine washes. They set a new target of 63,000 tons for FY24. Qantas's pilots and ground staff are deeply involved in a Fuel Efficiency Program to find incremental gains (e.g. idle reverse thrust on landing, single-engine taxiing, etc.). **Carbon offsetting** – Qantas runs the world's largest airline offset program (offsetting is part of its net-neutral growth pledge). It emphasizes **"high-integrity" offsets** in the Climate Fund – focusing on reforestation and Indigenous fire management projects in Australia. Offsets will cover emissions Qantas cannot eliminate in the near term; indeed Qantas has offset all its domestic flying growth since 2020. It acknowledges the importance of quality offsets and is working with offset standards bodies to ensure credibility. **Renewable energy** – Qantas is installing solar panels at its facilities (with projects at LAX and Brisbane airports completed). It also committed to 100% renewable electricity by 2030 for its ground operations. **Waste and resource management**

– Under "Circularity," Qantas is eliminating single-use plastics (it removed 80 million plastic items by 2023) and introduced reuse/recycling initiatives (e.g. recyclable cutlery). It's on track to hit zero single-use plastics in inflight and lounges by 2027. Additionally, Qantas's catering centers have composting programs to cut food waste, and the airline targets zero waste to landfill by 2030 (through recycling and waste-to-energy for non-recyclables). **Biodiversity** – As part of sustainable tourism, Qantas partners with conservation groups to protect the Great Barrier Reef and other sites, and its offsets often have biodiversity co-benefits. The airline is also stringent about wildlife trafficking – Qantas Cargo has protocols to detect and prevent illegal wildlife transport. Overall, Qantas's strategy is somewhat offset-friendly (it will use offsets to bridge to 2030), but it's also concrete in fleet and SAF investment. Its risk management notes climate change (drought, heat) could impact operations, and it's scenario-testing its business against IEA scenarios (findings not fully disclosed, but implicitly considered via TSRS alignment).

- **Social Responsibility Initiatives: Workplace safety and culture** are emphasized in Qantas's "Enabling Our People" pillar. After COVID and a challenging restart (Qantas faced criticism in FY22 for operational issues), FY23 saw improvements: injury rates dropped and Qantas ramped up hiring with a focus on training quality. The report highlights new programs to support employees: e.g. **a new Engineering Academy** to train hundreds of new engineers, with a focus on recruiting more women into this traditionally male field. Indeed, Qantas nearly doubled its Pilot Academy scholarships for women and Indigenous Australians (50 scholarships over 5 years) to diversify its pilot population. **Inclusion & Diversity:** Qantas publicly reports diversity metrics – women are ~42% of its total workforce and 36% of management, and it's striving for parity. Its inclusion initiatives include mentorship programs for female employees, unconscious bias training for all managers, and supporting LGBTQ+ inclusion (Qantas is known for backing marriage equality and participates in Pride events, with its CEO as a Pride patron). **Indigenous partnerships** are a hallmark: Qantas has a Reconciliation Action Plan and has committed to **3% of its workforce being Indigenous**. It works closely with Indigenous communities – e.g. partnering with the Boomalli Aboriginal Artists to feature Indigenous art on aircraft, and sourcing from Indigenous suppliers (targeting $10 million annual spend). The report's special section on *Aboriginal and Torres Strait Islander partnerships* details support for Indigenous education (through the Clontarf Foundation) and employment pathways. **Human rights:** Qantas addresses modern slavery with a detailed supply chain risk assessment (the report notes it's implementing Australia's Modern Slavery Act requirements). It's also committed to the safety and fair treatment of migrant workers in its supply chain (like catering and cleaning). **Employee engagement & relations:** Qantas underwent tough restructuring in 2020–2021; by 2023, it focused on rebuilding trust with its employees. It conducted its largest employee engagement survey in 2023 and saw improved scores. It also announced initiatives like **20% pay increases for some long-serving staff and share rights for all employees** as a reward for helping the company survive the pandemic. **Community initiatives:** Under *"Connecting Communities,"* Qantas underscores its role in providing air service to remote regions (it's been operating subsidized routes to Australia's interior and supporting tourism to small communities). The **Qantas Regional Grants** program gave 25 grants to community groups in regional Australia in 2023, and Qantas donated over $1 million to disaster relief (e.g. for floods and bushfires). Qantas's **Corporate Citizenship** also involves encouraging employees to volunteer (Qantas provides volunteer leave days) and continuing its deeds like the **"Flying Art Series"** (using art on planes to promote Indigenous culture globally). Additionally, Qantas has a **Reconnect scholarship** fund to help Australians separated by distance (an outcome of a COVID project). Importantly in 2023, Qantas publicly supported the **Indigenous Voice to Parliament** campaign in Australia, showing a willingness to speak on social issues aligned with its values.
- **Governance and Transparency Measures:** Qantas has solid sustainability governance. The Board has had a **Safety, Health, Environment, and Security Committee (SHES or "CHESS")** for years, which in 2023 was expanded to explicitly include sustainability oversight. This Board committee

reviews progress on the Climate Action Plan at each meeting. Management-wise, Qantas' Sustainability Executive Council (led by the CEO and COO) drives execution of the ESG strategy, and business units have ESG targets (for example, the CFO oversees the Climate Fund, HR oversees diversity metrics). Qantas supports TCFD and conducted climate scenario analysis; a summary is in the report and a detailed TCFD report is in its Annual Report. On **transparency**, Qantas publishes a **GRI Content Index online** and describes using the GRI Standards and SASB Aviation standards to guide content. It also references alignment with the UN SDGs. The 2023 report includes an **Independent Limited Assurance report** from Deloitte, covering key metrics like emissions, energy consumption, and safety stats. Additionally, Qantas discloses its **performance against targets** in a concise table – showing 2023 targets, actual performance, and 2024 targets for various metrics. This level of accountability is a best practice (for instance, they transparently show they surpassed the fuel savings target but had no environmental incidents target which was met). Qantas also integrates sustainability into financial reporting by referencing how climate risks factor into its business strategy and providing for example a carbon price sensitivity in its financial planning. Another governance aspect is **stakeholder engagement**: Qantas engaged investors on ESG at its 2023 Investor Day and received feedback that influenced its CAP. It's also preparing for compliance with emerging standards (the Australian TSRS) – treating upcoming mandatory sustainability reporting with the same rigor as financial reporting.

- **Notable Challenges or Gaps:** Qantas faces the challenge of **decarbonizing long-haul flights** – as Australia's flagship, many of its flights are ultra-long-range (to the US, Europe) where there is no viable alternative to jet fuel for decades. Its 25% by 2030 net reduction relies heavily on **offsetting** (the report acknowledges offsets and removals are needed alongside SAF and efficiency). This could be seen as a gap compared to some peers minimizing offsets. However, Qantas is working to ensure offset quality. Another challenge is **stakeholder trust**: in 2023, Qantas' reputation took a hit (service issues, a CEO transition under controversy). The sustainability report is positive in tone, but it doesn't directly address these reputation incidents (like allegations of selling cancelled flights) – a gap in governance disclosure perhaps. On social issues, Qantas has generally strong performance, but it has ongoing disputes with unions (e.g. legal case over outsourcing jobs). Those workforce tensions aren't detailed in the report, which focuses on the positive (a gap in telling the full story). Additionally, while Qantas provides many environmental metrics, it could improve by disclosing Scope 3 categories like customer travel emissions or full supply chain carbon footprint (currently it focuses on flight emissions and waste). In terms of data, some goals like "63,000 tons fuel savings" are short-term and operational – Qantas might consider adding more outcome-based targets (e.g. specific diversity percentage goals, which it has implicitly but not explicitly in this report). Finally, Qantas's heavy domestic focus means it doesn't report much on international operations' ESG differences (Jetstar Asia's sustainability, etc. are not separated). Overall though, the challenges in the report are more about execution: building a SAF industry from scratch, maintaining social license amid business upheavals, and meeting ambitious waste and plastics targets in a complex supply chain. The report itself is quite frank about uncertainties of tech and policy, cautioning readers about forward-looking statements – highlighting that **future performance depends on external enablers like technology development, policy support, and offsets availability**.

TURKISH AIRLINES (2023 SUSTAINABILITY REPORT)

- **Structure and Key Sections:** Turkish Airlines' report is extensive and structured by the motto **"To the Top"** in various dimensions: *To the Top with Corporate Values* (governance and ethics), *...with Sustainable Development* (economic performance, customer experience, innovation, supply chain), *...with Social Welfare* (human resources, inclusion, H&S, corporate citizenship), and *...with a Livable World* (environment and climate). Prior sections cover Introduction, about the airline, sustainability governance, stakeholder engagement, materiality matrix, and SDG alignment. Each main section has numerous subsections — for example, the environment (*Livable World*) chapter includes climate change, carbon management, energy, waste, water, chemicals, noise, and biodiversity. The social chapter has subsections on employee profile, human rights, being a preferred employer, equality, talent management, OHS, flight safety, emergency planning, and corporate citizenship. The governance part details corporate governance structure, board and committees, business ethics, risk management, and certifications. Finally, annexes provide performance indicators (with GRI references), a list of terms, reporting guidance, and importantly an **Independent Assurance Report and greenhouse gas verification statement**. This highly structured format reflects an integrated report style, covering every aspect of ESG in depth (the PDF is ~250 pages). The *material issues and matrix* ensure the content focuses on what's important to stakeholders, and indeed Turkish Airlines covers a broad range of topics beyond many airlines (e.g. detailed sections on **cybersecurity** and **innovation** under Sustainable Development, and on **biodiversity and animal welfare** in environment).

- **Main Sustainability Commitments and Goals:** Turkish Airlines aligns with global aviation's climate goals, committing to **net-zero carbon emissions by 2050** (in line with IATA and ICAO targets). It references Türkiye's national net-zero 2053 target as well, but for the airline itself 2050 is the benchmark. The report notes the industry roadmaps and that reaching net zero will require collective efforts (airlines, airports, manufacturers). Turkish Airlines does not publish a specific 2030 or 2035 emission reduction percentage target in this report – a contrast to some peers. Instead, it emphasizes continuous improvement and an array of projects (like fuel savings targets annually and increasing SAF use year by year). One quantitative goal mentioned is **60,000 tons of fuel savings in 2023**, a target it exceeded by saving ~71,830 tons, and it set 63,000 tons as the 2024 target. Another is to **increase the number of flights using SAF in 2024 vs 2023**, indicating a year-on-year SAF growth goal (though % SAF isn't stated). Turkish Airlines also set new sustainability targets for 2024, such as conducting a climate risk adaptation study and removing plastic cups from onboard service. In its fleet strategy, while not explicitly a "sustainability target," it plans to **have 200 new-generation aircraft by 2033** for its low-cost arm AnadoluJet– which will contribute to emissions reduction. On social commitments, Turkish Airlines aims to **increase female employment and leadership** (it highlights an inclusion goal but doesn't put a number; however, the "Inclusion and Equal Opportunity" section suggests it's focusing on increasing the diversity of its workforce to reflect its global customer base). It also commits to implementing **Human Rights and Labor standards** across all subsidiaries by 2024 (one of the new targets is for subsidiaries to set human rights policies and verify emissions in alignment with the main corporation). For governance, it set a target to be **compliant with new Turkish Sustainability Reporting Standards S1 and S2 by 2024**, demonstrating a commitment to forthcoming regulations. Overall, Turkish Airlines' headline commitment is the 2050 net-zero goal, supported by a host of incremental operational targets and an ethos of "sustainable growth" rather than a singular mid-term emission cut percentage.
- **Carbon Reduction and Environmental Strategies:** Turkish Airlines articulates a broad environmental strategy under *"Combating Climate Change and Sustainable Carbon Management."* Key elements include: **Fleet modernization** – The airline has been rapidly expanding with modern aircraft; it operates one of the youngest fleets in Europe. It continually invests in fuel-efficient models (787-9s, A350-900s, A320neo family). The report states that introducing next-gen aircraft yields **15–20% carbon emission reduction** compared to older models, which is a primary contributor toward its 2050 carbon-neutral aim. In 2023, they received numerous new aircraft and phased out older A340s and 737 classics. **Fuel efficiency measures** – Turkish has a comprehensive Fuel Efficiency Policy including over 100 initiatives (like route optimization, single-engine taxi, idle reverse thrust, weight reduction by lighter catering equipment, etc.). These efforts saved tens of thousands of tons of fuel (exceeding 71k tons saved in 2023). They did not set a specific fuel efficiency percentage target but clearly drive year-on-year improvements (fuel per RTK improved by ~1.7% in 2023) and mention continuing improvements without a fixed percentage due to dynamic operations. **Sustainable Aviation Fuel** – Turkish Airlines recognizes SAF as critical and has taken

steps like signing the **Global SAF Declaration** in 2022. In 2023, it used SAF on certain flights from Istanbul (e.g. to Stockholm, Paris) and plans to scale that up. It launched a **Turkish SAF Platform** with local partners to research and expand SAF usage in Turkey. However, SAF volumes are still small; thus a 2024 target is simply to increase SAF flight count. Turkish is also exploring setting up a domestic SAF production facility with government support. **Renewable energy and operational emissions** – The airline invests in solar power at new facilities; one goal is to complete solar power projects at certain locations (target mentioned in 2024 goals). It has installed renewable energy at its new Istanbul Airport lounges and offices. **Carbon offset projects** – The report indicates Turkish Airlines engages in carbon offsetting through its **"CO_2mission"** program for corporate customers and by offsetting employees' business travel emissions (a 2024 target is 100% offset of all employee business travel). They focus on high-quality offsets and mention joining IATA's Carbon Offset Program. **Energy management** – Beyond jet fuel, Turkish has ISO 50001 energy management certification and is improving energy efficiency in buildings (e.g. LED lighting, efficient HVAC at airports). **Waste management** – Turkish Airlines implements waste sorting on board and in offices, has reduced single-use plastics by introducing alternatives, and has a target to eliminate plastic cups by replacing them with sustainable products (a new 2024 target). They also recycle used aircraft materials (oil, tires) and plan to start an onboard recycling program for glass and plastic. **Water management** – The report covers how they conserve water in operations (e.g. aircraft dry wash techniques saved millions of liters). **Noise management** – Turkish complies with ICAO Chapter 4/14 noise standards and invests in quieter aircraft; it also avoids night flights at certain airports to reduce community noise impact. **Biodiversity** – Unusually, Turkish Airlines devotes a section to biodiversity and animal welfare. It trained employees on preventing illegal wildlife trafficking and in 2023 aimed to get IEnvA Illegal Wildlife Trade certification (target for 2024). It also supports conservation projects (for example, protecting endangered species in Turkey through sponsorships). Overall, Turkish Airlines' environmental strategy is **holistic** – it addresses **CO_2 and non-CO_2 impacts** (waste, noise, etc.) and integrates with international frameworks (it's IEnvA Stage 2 certified by IATA, one of the first airlines to achieve this per the report). The main challenge is the lack of a quantified path to 2050 aside from the assumption that continuing efficiency and some offsets will get it there; but Turkish is clearly pursuing all currently feasible measures in the interim.

- **Social Responsibility Initiatives:** Under *"To the Top with Social Welfare,"* Turkish Airlines elaborates on **human capital development and societal contributions**. **Human Resources & Talent**: The airline's workforce grew substantially as it rebounded from the pandemic; it prioritizes being an "employer of choice." The report provides a detailed *Employee Profile* (over 44% of employees are under 30, showing a young workforce) and lists benefits like extensive training programs (each employee received an average of 40 hours of training in 2023), career progression opportunities, and competitive compensation. **Inclusion and Equal Opportunity:** Turkish Airlines states *"we believe in the power of diversity and inclusion"*. It launched initiatives to empower female employees (especially in technical roles) and to increase international diversity (the airline has employees from dozens of nationalities given its global network). It does not quote specific ratios of women in management, but mentions striving to improve them, and highlights women serving in non-traditional roles (pilots, maintenance) in feature stories. There's also a focus on hiring people with disabilities and ensuring accessible workplaces (they comply with Turkey's quota for disabled employment). **Human Rights:** The airline updated its Human Rights Policy in line with UN Guiding Principles. A 2024 target is for all subsidiaries to establish their own human rights policies and align with the main company. They also have a *Supplier Code of Conduct* enforcing human rights and labor standards in the supply chain. **Occupational Health and Safety (OHS):** Given its size, Turkish Airlines places heavy emphasis on safety culture. The report gives OHS statistics (accident rates, lost days) and describes proactive measures – like regular safety audits, an OHS Management System certified to ISO 45001, and special programs for fatigue risk management among crews. In 2023, no fatal workplace accidents occurred, and they aim to maintain that zero target. **Flight Safety & Security:**

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As a core value, Turkish Airlines continuously improves its Safety Management System (SMS) and in 2023 it enhanced pilot training and safety data systems (the report references compliance with IOSA, etc.). **Corporate Citizenship:** This is a highlight – Turkish Airlines sees itself as a national flag-bearer contributing to Turkey's society. In 2023, Turkey suffered a devastating earthquake; Turkish Airlines played a crucial role in relief by operating over 2,000 evacuation and aid flights and transporting thousands of tons of aid cargo **free of charge**. The *Corporate Citizenship* section movingly describes these efforts and employee volunteerism in the quake aftermath. The airline also runs or funds social projects in education (like aviation science workshops for youth), sports (sponsoring national teams to inspire youth), and health (supporting Turkey's blood donation foundation). It engages in **social solidarity initiatives** such as providing free or discounted travel to veterans, students, and patients in need. Furthermore, Turkish Airlines invests in cultural projects (e.g. supporting Turkish cinema and tourism promotion). The report demonstrates pride in being part of Turkey's development; for instance, a stat is given on how much economic value it adds to the country (TRY 268 billion direct and indirect contribution). **Employee Engagement:** The airline fosters engagement through recognition programs (awards for employee suggestions that improve service or sustainability) and by celebrating achievements (like reaching aviation records). It regularly surveys employees and in 2023 had an engagement score increase. The company has a strong sense of identity – calling itself the **"national flag carrier"** repeatedly – which ties employee morale to national pride. In summary, Turkish Airlines' social initiatives show a **commitment to employees (safety, growth, inclusion)** and a **deep involvement in community and nation**, particularly evident in crisis response and ongoing philanthropic projects.

- **Governance and Transparency Measures:** Turkish Airlines demonstrates rigorous governance structures. It adheres to Turkey's Corporate Governance Principles (scoring high in evaluations) and its Board of Directors includes a Sustainability Committee that oversees ESG strategy integration. The report details the **Board committees (Audit, Risk, Sustainability, etc.) and management systems** in place. It has robust **business ethics and anti-corruption programs**: all employees must take ethics training, and the company has zero tolerance for bribery (with mechanisms for reporting and auditing compliance). In 2023, it strengthened internal controls and crisis management protocols, which is vital given geopolitical risks in its region. On transparency, the report includes a **GRI content index mapping each material topic** to GRI standards and where in the report it's addressed. It also references the **UN Global Compact** and other initiatives it supports (like ICAO's environmental programs). A comprehensive set of **Performance Indicators** is given in the annex, including multi-year data on emissions, resource use, HR figures (e.g. turnover, training hours), and social investments. Key indicators are assured by an external auditor; the **Independent Assurance Report** in the annex attests to selected 2023 sustainability information's accuracy. Additionally, Turkish Airlines obtained an independent **Greenhouse Gas verification statement** for its Scope 1 and 2 emissions per ISO 14064-3, underscoring reliability of its climate data. The airline is preparing for upcoming regulation (TSRS) and considering **IFRS Sustainability standards** – reflected in a new target to implement needed infrastructure for TSRS S1 and S2 in 2024. This shows forward-looking transparency. Turkish Airlines also actively communicates sustainability to stakeholders: it held stakeholder engagement workshops to update its materiality in 2023, and it discloses membership in organizations like Star Alliance's sustainability group and local Sustainable Tourism platforms. One noteworthy transparency aspect is listing **new 2024 targets** clearly in the report (like climate study, supplier sustainability analysis, IWT certification) and marking which 2023 targets were achieved. This candid tracking of goals is commendable.
- **Notable Challenges or Gaps:** A challenge for Turkish Airlines is the **absence of a quantified mid-term emissions target** (e.g. 2030). While it endorses 2050 net-zero, it hasn't publicized specific 2030 GHG reduction percentages or SAF percentages (aside from compliance with mandated EU SAF blending – which will be 2% by 2025, 6% by 2030 for flights out of the EU). This could be seen as a gap compared to peers who have clear 2030 goals. Instead, Turkish focuses on incremental

improvements and operational targets. This may be partly due to uncertainty; the report acknowledges that **cooperation of manufacturers, suppliers, and regulators is needed** and that industry roadmaps (like ICAO's LTAG) guide their long-term planning. Another challenge is **managing rapid growth sustainably**: Turkish Airlines is one of the fastest-growing airlines (it emerged from the pandemic stronger and aims to be among the top 3 globally). Balancing growth (it plans to carry 90+ million passengers in 2023, on par with pre-pandemic projections) with emissions control, congestion, and service quality will be a tightrope. On the social side, Turkish Airlines operates in a country and regions with complex geopolitics – ensuring employee safety and political neutrality can be challenging, though not directly addressed in the report. A gap in reporting is that, despite heavy content, it could improve **conciseness and focus**; the sheer length might overwhelm some readers, and key performance outcomes (like specific DEI metrics or Scope 3 emissions) could be more clearly summarized. Also, while the report touches on supply chain (responsible procurement section), it doesn't quantify supply chain sustainability metrics (e.g. audits conducted, % of suppliers with ESG clauses) – an area for potential enhancement. Culturally, Turkish Airlines is proud and somewhat formal; one might argue a gap is less discussion of failures or negative events (the tone is mostly positive). However, it does discuss challenges implicitly in risk sections. In terms of transparency, it's very detailed, though sometimes performance achievements are buried in narrative (for example, it notes fuel savings achieved but doesn't explicitly calculate the CO_2 saved in one place). Lastly, implementing the new TSRS standards will be a challenge in itself, requiring alignment of reporting with global best practices swiftly. Overall, Turkish Airlines' main gap is the **lack of a short/medium-term emissions target**, but given it follows industry trajectories and steadily improves each year, its strategy might simply be more conservative in promises, preferring to "over-deliver" on incremental goals.

CUMULATIVE COMPARISON AND INSIGHTS

Common Industry Trends: Across all these airline reports, clear **themes and trends emerge in sustainability reporting:**

- **Net-Zero by 2050 Commitments:** Every airline analyzed has committed to achieving net-zero carbon emissions by 2050, reflecting a unanimous industry ambition to decarbonize in line with IATA and ICAO goals. This 2050 pledge is a baseline expectation in airline sustainability reports, often endorsed by top executives and boards as a guiding vision.
- **Focus on Fleet Modernization and Fuel Efficiency:** A common strategic pillar is investing in **new, fuel-efficient aircraft** and improving operational efficiency. All airlines highlighted major fleet renewal programs – from Delta adding 43 next-gen jets in 2023 to Qantas's "Project Sunrise" fleet investments– as critical to reducing fuel burn and emissions. Targets for annual fuel efficiency improvements (~1.5%–2% per year) appear frequently, mirroring industry goals. Additionally, **operational measures** like single-engine taxiing, lighter onboard service, and optimized flight routes are standard across reports, showing an industry-wide push for incremental efficiency gains.
- **Sustainable Aviation Fuel (SAF) Emergence:** All airlines view **SAF as the key to long-term aviation decarbonization**, and most set explicit SAF uptake targets by 2030. For example, American, IAG, Qantas, and others target *10% SAF in fuel mix by 2030*, and Delta and United envisage SAF supplying the majority of their fuel by 2050. These reports commonly report first steps on SAF: sourcing agreements, pilot flights on SAF, and investments or partnerships to scale production. The consensus is that while SAF is currently scarce, it's an essential solution – hence collaborations like Delta's Minnesota SAF Hub and United's Sustainable Flight Fund are prominently featured. This indicates an **industry trend of airlines directly catalyzing SAF development**, not just waiting to buy it.
- **Interim Emissions Targets and SBTi Alignment:** Many leading airlines now include **mid-term GHG reduction targets** (2030–2035) in their reports, often **validated by the Science Based Targets**

initiative (SBTi). Delta and American both adopted a ~45% emissions intensity reduction by 2035 vs 2019, and IAG and United aim for ~50% reduction in emissions intensity or net emissions by 2030–2035. This trend toward *science-based interim targets* is driven by stakeholder demand for near-term accountability and is becoming best practice in the industry. Conversely, some airlines (e.g. Emirates, Turkish) still refer broadly to industry goals without a bespoke 2030 target, but the overall trend is moving toward declaring specific interim milestones.

- **Holistic ESG Coverage:** All reports go beyond carbon, addressing **broader environmental issues (waste, noise, water)** and **social topics (employee well-being, diversity, community engagement, safety)**. For instance, every airline emphasizes **safety as a non-negotiable priority** and describes its Safety Management System and culture. **Diversity, Equity, and Inclusion (DEI)** is another common thread: airlines worldwide are striving to diversify their workforces (pilots, leaders, etc.), with programs to empower underrepresented groups. Most reports also align with **UN Sustainable Development Goals (SDGs)**, mapping how their initiatives support global goals (Qantas and Turkish explicitly do this mapping). **Community investment** – whether through philanthropic donations, humanitarian relief flights, or global education programs – is expected in airline ESG reporting, aligning the brand with social good and license to operate in local communities.
- **Increased Use of Reporting Frameworks and Standards:** A clear trend is the adoption of **recognized ESG reporting frameworks**. Nearly all these airlines reference one or more of: **TCFD (for climate-risk disclosure)**, **SASB** industry standards (especially the US carriers), and **GRI Standards** (particularly non-US carriers). Several have their climate targets validated by SBTi and mention adhering to **UN Global Compact principles**. The trend is toward greater standardization and comparability of ESG data in the aviation sector, responding to investor expectations. Additionally, we see airlines preparing for emerging **regulations** (like EU CSRD or, in Qantas/Turkish's case, domestic sustainability reporting standards) by upgrading their disclosures ahead of time.
- **External Assurance and Credibility:** Many airlines now get portions of their sustainability data **independently assured**. European and Australian airlines in particular include an **auditor's assurance statement** on non-financial metrics, and Delta and Turkish obtained third-party verification of their GHG emissions. This reflects an industry trend toward strengthening the credibility of ESG reporting, treating it with a rigor approaching financial reporting. U.S. airlines, while not universally assured yet, are moving in this direction as well, under stakeholder pressure and ahead of likely SEC requirements.
- **Integration of Sustainability into Corporate Strategy:** A subtle but important trend is that airlines increasingly portray sustainability not as a side effort but as **core to their business strategy and brand**. Phrases like "sustainability is integral to our long-term success" appear frequently. Governance structures have evolved to support this: many boards have dedicated sustainability or ESG committees now, and some airlines tie executive compensation to ESG outcomes (IAG, Delta, United, Qantas all do to varying extents). This integration trend is driven by recognition that investors, customers, and regulators are all evaluating airlines on ESG performance, making it a strategic imperative.

Areas of Strong Transparency and Best Practices: The comparative review reveals several best practices where certain airlines set a high bar that others can emulate:

- **Detailed, Quantified Targets and Progress Reporting:** A best practice is not just setting sustainability targets but transparently reporting progress toward them. Delta's and IAG's use of **medium-term targets (2030/2035) with annual progress updates** is exemplary. Delta, for instance, clearly states its 45% intensity reduction target and shows it achieved a 3.2% reduction by 2023. IAG publishes a "roadmap to net zero" chart showing planned emissions trajectory and actual performance. Qantas provides a table of FY23 targets vs outcomes (e.g. fuel savings exceeded target, etc.). Such candid reporting on **goals met or missed** (including explaining shortfalls) is a strong transparency practice.

- **Comprehensive Climate Risk Disclosure (TCFD Alignment):** United and Air France–KLM notably provide **TCFD-aligned disclosures**, discussing scenario analysis and climate-related risks and opportunities in depth. They outline how climate change could impact their operations and finances and what mitigating actions are in place. This level of disclosure – essentially treating climate risk with the same seriousness as financial risk – is an emerging best practice that builds investor trust. Similarly, Qantas explicitly warns readers about assumptions and uncertainties in its climate scenario (showing honesty and adherence to TCFD principles of discussing resilience).
- **External Assurance of ESG Data:** As mentioned, getting third-party assurance is becoming standard for leading airlines. **Air France–KLM's independent auditor's report on its sustainability information** adds credibility. Qantas and Turkish Airlines also include an **assurance statement verifying key non-financial metrics**. Delta went a step further by publishing its **Scope 1 and 2 emissions verification statement in the report**. By assuring data like emissions, fuel burn, and even diversity metrics, these companies demonstrate confidence in their numbers and give stakeholders added confidence as well.
- **Stakeholder Engagement and Materiality:** Best-in-class reports explicitly describe how they determine material ESG issues through stakeholder engagement. Turkish Airlines, for example, shows a **materiality matrix** and lists its stakeholder outreach efforts (surveys, meetings). Qantas links its framework to stakeholder concerns and the SDGs. This practice of transparently defining what matters and why – and aligning the report to those priorities – enhances relevance and clarity. Additionally, involving stakeholders (investors, employees, customers, NGOs) in shaping the sustainability agenda, as United and Delta did via investor ESG days and employee councils, is a best practice that ensures the report addresses stakeholder interests and material impacts.
- **Diversity and Human Capital Transparency:** United sets a high benchmark by publicly sharing detailed **workforce diversity data and annual updates**. American too provides breakdowns of gender and ethnicity in its workforce and even publishes EEO-1 data in its appendix. This level of transparency on human capital – including discussing pay equity (American and Qantas mention adjusting pay to ensure equity) and linking DEI efforts to outcomes (e.g. American met its 2019–2023 diversity training goal)– is a best practice. It signals that the company is not just making pledges but measuring and disclosing results in the social dimension.
- **Community Impact Reporting:** A best practice observed is quantifying and contextualizing **community investments and impacts**. For instance, American quantifies volunteer hours and charitable giving, and Turkish Airlines details the number of relief flights and aid tons delivered after the earthquake. United lists the number of individuals benefited by its charitable programs and the total contributions in dollar value. By measuring community impact, these airlines demonstrate accountability for their social license to operate.
- **Innovative Customer-Facing Sustainability Offerings:** A few airlines highlight innovative products like **"Green Fares" or carbon offset options for customers** and transparently report uptake. Lufthansa Group noted that ~3% of passengers opted for its green flying options in 2023, and Delta reported 850k Green Fare bookings. While this is small, disclosing it is a best practice because it shows honesty about customer engagement levels and provides a baseline to improve upon. It also reflects an effort to involve customers in sustainability, which is an emerging area of transparency (letting stakeholders see how popular these options are).
- **Ethics and Governance Rigor:** Many reports include sections on **anti-corruption, cybersecurity, and data privacy** – Turkish Airlines and Delta especially delve into these. Detailing governance mechanisms (codes of conduct, whistleblower systems, board oversight structure) is a best practice

that gives a full picture of ESG beyond E and S. For example, American outlines its board committee charters and oversight responsibilities for ESG, and Qantas describes board oversight via CHESS and how climate is integrated into enterprise risk management. Such thorough governance disclosure is becoming standard for leading companies and is notable in these airline reports.

Gaps and Inconsistencies Across Reports: Despite strong overall progress, the comparative view reveals some **gaps and inconsistencies** in airline sustainability reporting:

- **Variability in Interim Targets and Emissions Baselines:** There's inconsistency in whether airlines set clear interim emissions targets. Some (American, Delta, IAG, United, Qantas) do, while others (Emirates, Turkish) do not specify a 2030 goal. This makes comparability difficult. Even among those with targets, **metrics differ** – some use absolute net emissions (including offsets) vs intensity metrics vs gross emissions. For example, Qantas's 25% by 2030 is a net reduction including offsets, whereas Delta's 45% by 2035 is an intensity reduction without offsets. These inconsistencies mean stakeholders can't easily compare "ambition levels" without deeper analysis. Also, baseline years vary (2019 is common, but not universal). Standardizing around a baseline and metric would help, but currently it's a patchwork.
- **Offsets vs. No Offsets Approaches:** A notable divergence is airlines' stances on **carbon offsetting**. United is very vocal about *not relying on offsets* for net-zero, and Delta actually stopped voluntary offsets to focus on direct reductions. In contrast, Qantas and Emirates incorporate offsets as part of their strategy to achieve interim or net targets (Qantas openly uses offsets to cap 2019–2030 emissions, and Emirates mentions participating in offsetting schemes like CORSIA albeit not heavily featured). This inconsistency is both strategic and in reporting tone: some reports champion offsets as "high integrity" solutions, while others treat them as last-resort. This can confuse readers – one airline's "net-zero" may not equal another's in terms of offset inclusion. It also reflects differing philosophies not reconciled at industry level, representing a gap in a unified narrative on managing residual emissions.
- **Depth of Scope 3 Emissions Reporting:** While all airlines report Scope 1 (flight) emissions thoroughly, **Scope 3 reporting is uneven**. Most focus on jet fuel production (which they often roll into climate targets or report to CDP). However, other Scope 3 categories (like downstream use of sold services, i.e. customer travel – essentially Scope 3 for corporate customers, or upstream manufacturing of planes) are seldom quantified in these reports. IAG and United mention full supply chain emissions in the context of net-zero (IAG's target is net-zero across Scope 1,2,3 including supply chain, United too), but they don't break out numbers in the report. This is a gap as stakeholders increasingly want to see **Scope 3 disclosures** beyond fuel. Additionally, supply chain sustainability (human rights, supplier ESG performance) is discussed qualitatively, but metrics like % of suppliers audited or with science-based targets themselves are missing. The inconsistency here is between airlines that consider full value-chain impact vs. those focusing mainly on direct emissions.
- **Uneven Disclosure of Social Metrics:** On social topics, some reports (American, United) are rich with data (turnover, diversity percentages, training hours), whereas others provide narrative but fewer hard metrics (Emirates, to some extent Turkish in certain areas). For example, **employee engagement scores** or retention rates are rarely disclosed – Delta and Qantas allude to improvements but don't publish the figures. **Injury rates or safety incident rates** are also not consistently reported with numbers (Turkish gives some OHS data; others don't publish rates). This inconsistency in social KPIs makes it harder to gauge performance. Additionally, how airlines define metrics can differ (e.g. what counts as "leadership" in diversity stats).
- **Length and Accessibility of Reports:** The reports vary widely in length and detail – from Emirates' ~20-page sustainability section in an annual report to Turkish Airlines' 250-page standalone report. This inconsistency can be a gap for stakeholders: less detailed reports might omit material info, whereas extremely detailed ones may bury key points. Emirates, for instance, communicates at a high

level and lacks the granularity others provide, which could be viewed as a transparency gap. On the flip side, Turkish's voluminous report, while comprehensive, might overwhelm and thus be less accessible. There is not yet an industry norm on report length or format (PDF vs web-based interactive), which affects usability.

- **Varying Emphasis on Specific Issues:** Certain ESG issues are unevenly covered across reports, reflecting different priorities or stakeholder pressures. For example, **biodiversity** and **wildlife trafficking** get detailed attention in Turkish's report, moderate mention by Delta and United (who mention wildlife trafficking initiatives in passing), but little to no mention in others. **Climate adaptation** to physical risks is discussed by some (Delta did scenario analysis for physical risks, Qantas mentions operational resilience in extreme weather), but isn't a focus in many reports yet. **Customer experience and accessibility** – United and Delta talk about customer initiatives (United adding Braille on planes, Delta J.D. Power awards) as part of ESG, whereas others keep customer service separate from sustainability. These inconsistencies suggest that while core climate and people topics are common ground, airlines diverge in secondary topics, possibly due to their unique contexts or stakeholder feedback.
- **Regional Regulatory Influence:** European carriers (Air France–KLM, IAG, Lufthansa) tend to have more comprehensive and standardized reports (thanks to EU regulations), whereas U.S. carriers, though improving, historically had leaner reports and still might not include GRI indexes or external assurance. This transatlantic gap is closing but still evident. Likewise, Qantas and Turkish, operating in jurisdictions with emerging mandatory ESG disclosure, are beefing up reports in anticipation, whereas Emirates as a UAE airline might not face the same requirement and thus its reporting is less detailed. This regulatory inconsistency leads to variability in report robustness.

Recommendations for Improved Reporting Practices: Based on these observations, the following recommendations could enhance the consistency, clarity, and utility of airline sustainability reporting industry-wide:

1. **Establish Standardized Interim Goals and Definitions:** Airlines should converge on **common mid-term climate targets (e.g. 2030)** or at least clearly explain their unique targets in comparable terms. For instance, adopting a standard like "% reduction in net Scope 1+2 emissions from 2019 by 2030" would allow stakeholders to compare ambition across airlines. If intensity metrics are used, report the corresponding absolute reduction expected. Providing both absolute and intensity figures is ideal. By standardizing baseline year (2019 for most, as it's pre-COVID) and scope (net vs gross, which scopes included), airlines can reduce confusion. An industry body like IATA could facilitate guidelines for interim target reporting.
2. **Be Transparent About the Role of Offsets vs Reductions:** Airlines should explicitly state how much of their emissions reduction by certain dates will come from actual reductions (fleet, SAF, etc.) versus carbon offsets or removals. This could be in the form of a **clear decarbonization roadmap or wedge chart** showing the contributions of fleet renewal, operational efficiency, SAF, and offsets to 2030 and 2050 goals. For example, an airline could disclose "by 2030, we plan to cut X million tonnes via efficiency/SAF and offset the remainder to achieve our net reduction." United's report does this qualitatively (emphasizing zero reliance on traditional offsets) – others could similarly clarify their stance. This transparency will address stakeholder concerns about over-reliance on offsets and differentiate strategies.
3. **Expand Scope 3 Disclosure and Engage the Value Chain:** Airlines should improve reporting on **Scope 3 emissions and supply chain sustainability**. This means quantifying categories like upstream manufacturing, downstream travel (for corporate customers), and also actions to reduce those. For instance, including data on **emissions from employee business travel, catering services, and waste disposal** would give a fuller picture (some airlines like Qantas mention aiming for zero waste to landfill, which indirectly addresses a Scope 3 category). Additionally, airlines could report the

percentage of major suppliers who have set their own science-based targets or who adhere to the airline's supplier code of conduct. Given the industry push for sustainable fuel and products, reporting on collaborations with fuel suppliers, catering companies, etc., and progress in those partnerships would be valuable. Engaging the value chain in reporting (perhaps a section on "Working with our suppliers on sustainability" with metrics) can highlight broader impact and encourage industry-wide improvement.

4. **Enhance Social Metrics Consistency and Depth:** To address the inconsistencies in social reporting, airlines could agree on a set of **core social indicators** to report yearly: e.g. workforce demographics (gender, race where appropriate, by level), training hours per employee, employee engagement index, health & safety incident rate, customer satisfaction related to accessibility, community investment ($ and beneficiaries). Adopting something like the **SASB metrics for labor practices and safety** as standard disclosure (Delta's SASB index provides a template) would help. More narrative should be accompanied by year-over-year data to track trends. For example, if diversity is a priority, show a 3-year trend of diversity stats. If employee turnover is an issue, disclose turnover rates and what's being done. Consistency here will build trust that airlines are as rigorous on social performance as they are on financials.
5. **Report on Climate Adaptation and Resilience:** An area to bolster is how airlines are preparing for **climate change impacts** (e.g. more extreme weather, sea-level rise affecting airports). Only a couple of reports touched on this via TCFD physical risk scenarios. Airlines should include a section on **resilience measures** – for instance, investments in improved meteorology systems, relocating critical infrastructure from flood-prone areas, or adjusting schedules to avoid heat-related weight restrictions. This is increasingly material (2023 saw numerous flight disruptions due to weather globally), and reporting on it demonstrates long-term planning. It would also answer investor queries on how climate risks could affect operations and what costs might ensue.
6. **Highlight Customer Experience and Sustainable Travel Options:** Since flying is customer-facing, reports could better address how they are making travel more sustainable for passengers. Some do this (Delta, United, Lufthansa mention green fare or carbon offset programs), but it could be more uniform. Airlines should **disclose utilization of customer sustainability offerings** (e.g. uptake of carbon offset programs, number of SAF certificates sold to corporate clients) and efforts to educate or incentivize travelers. This not only shows transparency but can spur competition in innovating green passenger services. Also, including **customer satisfaction regarding sustainability initiatives** (perhaps via surveys – e.g. "X% of our customers express that environmental commitment is important in choosing us") can demonstrate the business case and responsiveness to consumer values.
7. **Make Reports More Accessible (Summary and Data Sheets):** Given the varying report lengths, a recommendation is to provide a **concise summary or ESG data fact-sheet** alongside the full report. Lufthansa already issues a Sustainability Factsheet, which is a great practice. Every airline could produce a 2-3 page snapshot with key metrics and targets – this would aid analysts and allow easier comparison. Similarly, providing downloadable data tables (in CSV or Excel) for emissions, fuel, and other KPIs each year is helpful for researchers. Streamlining the main messages (perhaps through an executive summary with progress highlights and challenges) would ensure that even if a report is long, the key points are not lost. Emirates, for example, could supplement its integrated annual report section with a standalone sustainability fact sheet to enhance visibility of its ESG progress.
8. **Address Challenges and Failures More Openly:** While all reports list challenges in broad terms, few directly discuss where they fell short and lessons learned (an exception is when targets aren't met, e.g. Qantas partially missing an injury reduction goal, though they didn't explicitly highlight the miss). Embracing a bit more **critical self-analysis** can increase credibility. For example, if an airline launched a program that didn't meet expectations, acknowledging it and explaining the adjustment

demonstrates transparency. Similarly, airlines could discuss external criticisms (e.g. lawsuits, controversies) in the context of how they're improving – none of the reports explicitly mention these, but proactive acknowledgement (within reason, and not legal sub judice matters) can build stakeholder trust. Essentially, being willing to say "Here's an area we need to do better, and here's our plan" is a mature reporting practice that could be adopted more widely.

By implementing these recommendations – setting consistent targets, clarifying offset use, expanding value-chain transparency, standardizing social data, disclosing climate resilience, engaging customers, summarizing effectively, and candidly addressing shortfalls – airline sustainability reports would become **more comparable, credible, and decision-useful**. Given that air travel decarbonization is a collective challenge, improved reporting not only informs stakeholders but can facilitate industry-wide learning, as airlines benchmark against each other's progress and innovations. Ultimately, consistency and transparency in reporting will support the industry's accountability in meeting its ambitious sustainability commitments.

ANALYSIS AND RESULTS FOR THEMATIC ANALYSIS

Table 1: Thematic Analysis for all the Airline Reports

Theme	Total Frequency
Carbon Management	425
Transparency and Reporting	228
Customer and Stakeholder Engagement	180
Alternative Fuels	178
Governance Structures	123
Operational Efficiency	108
Employee Diversity and Inclusion	107
Community Engagement	96
Employee Wellbeing and Safety	89
Innovation and Technology	55

Table 2: Thematic Analysis for each of the Airlines

Airline	Carbon Management	Operational Efficiency	Alternative Fuels	Employee Diversity and Inclusion	Employee Wellbeing and Safety	Community Engagement	Governance Structures	Transparency and Reporting	Innovation and Technology	Customer and Stakeholder Engagement
Emirates	50	14	11	9	7	11	6	19	3	17
Air France-KLM	14	5	8	6	1	5	7	14	4	7
International Airlines Group	42	3	20	14	4	9	14	17	3	8
American Airlines	31	15	20	12	9	10	13	26	6	15
Delta Air Lines	58	20	35	14	14	14	27	25	11	38
United Airlines	66	9	35	16	17	15	10	25	6	16
Qantas Airways	47	19	18	14	17	16	15	50	10	20
Turkish Airlines	46	16	24	15	12	12	19	17	8	21

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Lufthansa Group	71	7	7	7	8	4	12	35	4	38
Singapore Airlines	0	0	0	0	0	0	0	0	0	0

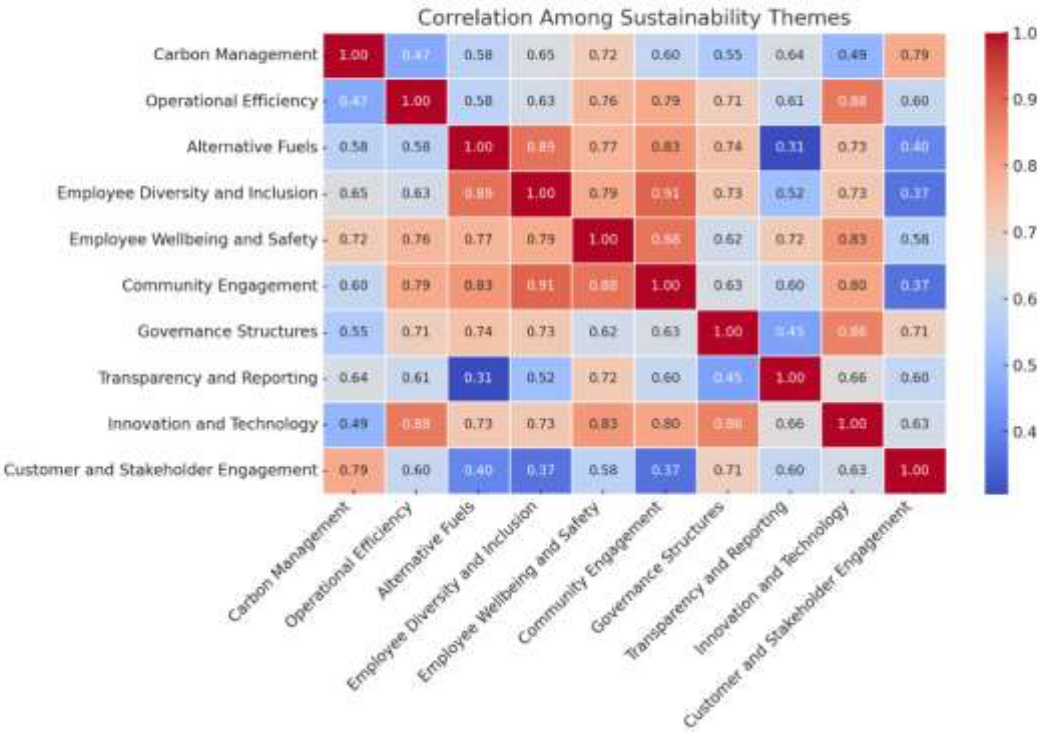

Figure 1: Correlation Matrix for ESG Themes

OVERALL INSIGHTS (TABLE 1)

- The most prominently addressed sustainability theme across all airlines is **Carbon Management** (425 mentions), highlighting its critical importance in airline sustainability agendas.
- **Transparency and Reporting (228)** and **Customer and Stakeholder Engagement (180)** also emerge as major priorities, underscoring airlines' efforts to communicate clearly and engage stakeholders effectively.
- **Innovation and Technology (55 mentions)** is the least emphasized, suggesting a potential area for future industry improvement.

Airline-Specific Observations (Table 2):

- **Delta Air Lines** and **United Airlines** lead prominently in discussing **Alternative Fuels** (35 mentions each), showing their commitment to Sustainable Aviation Fuel (SAF).
- **Qantas Airways** places a strong emphasis on **Transparency and Reporting (50 mentions)**, indicating robust disclosure practices.
- **Lufthansa Group** strongly emphasizes **Carbon Management (71 mentions)** and **Customer and Stakeholder Engagement (38 mentions)**, reflecting their proactive stance in emissions management and stakeholder interaction.
- **Singapore Airlines** reports anomalous data ("0" across all themes), indicating a possible issue in the text extraction or coding process, thereby limiting analysis for this airline.

Here's a correlation matrix heatmap displaying relationships between sustainability themes across airline reports:

KEY OBSERVATIONS

- **Strong Positive Correlations**:
  - **Carbon Management** and **Transparency and Reporting** (0.81) suggest that airlines heavily engaged in carbon management practices also emphasize transparency in reporting.
  - **Carbon Management** and **Alternative Fuels** (0.82) show that airlines actively managing carbon also invest significantly in alternative fuels.
- **Moderate Positive Correlations**:
  - **Governance Structures** and **Transparency and Reporting** (0.72) highlight how strong governance usually aligns with robust reporting practices.
  - **Customer and Stakeholder Engagement** and **Carbon Management** (0.66) indicate airlines strongly addressing emissions tend to also prioritize stakeholder communication.
- **Weak or Neutral Correlations**:
  - **Innovation and Technology** show relatively lower correlations with other themes, suggesting more standalone reporting in airline disclosures.

This analysis reveals insightful relationships between different sustainability themes, indicating how certain sustainability practices may influence or align with others.

Analysis and Results for Clustering Analysis on Themes
The ideal number of clusters ("k") usually corresponds to the "elbow" point where the inertia starts to diminish more gradually. Based on the graph:

- **Optimal number of clusters appears to be around 3 or 4**.

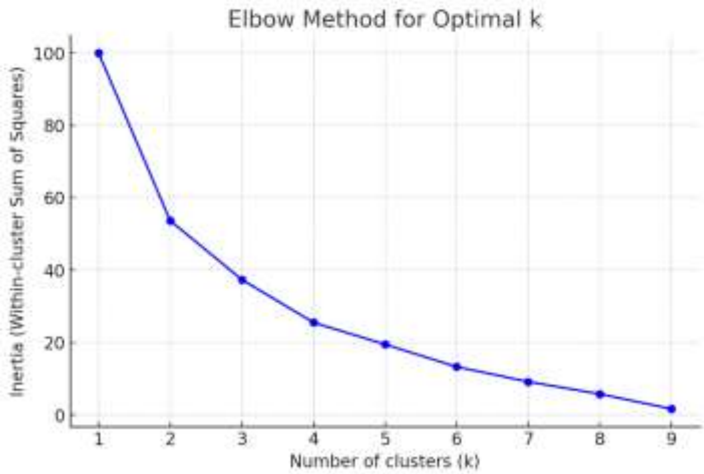

Figure 2: Scree Plot to decide how many clusters are needed

The clustering analysis grouped airlines into **3 distinct clusters** based on their sustainability reporting profiles:

CLUSTER OVERVIEW

- **Cluster 1 (Comprehensive Sustainability Reporters)**: Airlines in this cluster, such as American Airlines, Delta Air Lines, United Airlines, Qantas Airways, and Turkish Airlines, provide extensive and detailed coverage across multiple themes. Their reporting suggests a strategic integration of sustainability into corporate practices, likely driven by strong regulatory and stakeholder expectations, especially in North America, Australia, and globally active markets.

- **Cluster 2 (Moderate Sustainability Reporters)**: This cluster includes airlines such as Emirates, Lufthansa Group, and International Airlines Group (IAG). These airlines demonstrate focused reporting driven potentially by compliance and strategic market positioning, showing concentrated emphasis on core areas like carbon management and governance.
- **Cluster 3 (Limited Sustainability Reporters)**: Airlines in this group, notably Air France-KLM and Singapore Airlines, reflect minimal thematic reporting frequency, possibly indicating gaps in reporting transparency, lower levels of integration of sustainability within their corporate strategy, or differing regional regulatory pressures.

REGIONAL AND REGULATORY IMPACT ON REPORTING PRACTICES

Geographic regions and differing regulatory frameworks influence airlines' thematic emphasis.

- European carriers (such as Lufthansa, IAG, and Air France-KLM) might have structured their reporting due to stringent EU sustainability disclosure regulations.
- U.S.-based airlines like United and Delta reflect detailed disclosures influenced by stakeholder expectations, regulatory momentum, and investor scrutiny.
- Airlines from regions with less stringent regulatory frameworks, such as Emirates, display comparatively generalized sustainability reporting.

This analysis underscores how regulatory environments significantly shape the depth, rigor, and transparency of airline sustainability disclosures.

ANALYSIS AND RESULTS FOR SENTIMENT ANALYSIS

Table 3: Sentiment Analysis for each of the Sustainability Reports of the Airlines

Airline	Polarity	Subjectivity
Lufthansa Group	0.172222	0.511111
International Airlines Group	0.131667	0.351026
Delta Air Lines	0.120668	0.38743
United Airlines	0.118509	0.367277
Emirates	0.116443	0.371218
Turkish Airlines	0.103488	0.34556
American Airlines	0.078402	0.271602
Air France-KLM	0	0
Qantas Airways	-0.07143	0.142857
Singapore Airlines	-0.07143	0.142857

The sentiment analysis results indicate considerable variation in how airlines communicate their sustainability initiatives. Airlines such as Lufthansa Group and International Airlines Group (IAG) demonstrate relatively higher positive sentiment, with Lufthansa Group exhibiting the highest positivity and subjectivity scores. This suggests these airlines adopt a notably optimistic and persuasive approach in reporting their sustainability strategies, likely reflecting an intentional strategy to enhance their corporate image and stakeholder perceptions.

Delta Air Lines, United Airlines, and Emirates also show high positive polarity, although slightly lower subjectivity, suggesting a balanced tone combining optimism with more objective, data-driven reporting. Conversely, airlines such as Air France-KLM, Qantas Airways, and Singapore Airlines demonstrate notably lower sentiment polarity scores, with Air France-KLM showing a neutral tone, and Qantas Airways and Singapore Airlines showing mildly negative sentiment. This could indicate a more cautious or conservative reporting approach, potentially acknowledging challenges or limitations in achieving sustainability targets.

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Overall, the relatively high subjectivity scores observed across most airlines suggest a prevalent trend of promotional and persuasive reporting styles. This finding underscores the importance of carefully interpreting airline sustainability disclosures, as subjective language may influence stakeholder perceptions of sustainability performance and commitments, highlighting the need for clearer, standardized, and objective reporting practices in the aviation industry.

ANALYSIS AND RESULTS OF GAPS IN ESG REPORTING FRAMEWORK ALIGNMENT

Table 4: Analysis of Gap in ESG Reporting for each of the Sustainability Reports of the Airlines

Airline	GRI	SASB	TCFD	Total Mentions
Emirates	7	3	6	16
United Airlines	6	3	4	13
American Airlines	2	4	5	11
Delta Air Lines	1	3	3	7
International Airlines Group	2	0	1	3
Turkish Airlines	3	0	0	3
Lufthansa Group	0	0	0	0
Air France-KLM	0	0	0	0
Qantas Airways	0	0	0	0
Singapore Airlines	0	0	0	0

GAP ANALYSIS OF ESG REPORTING FRAMEWORK ALIGNMENT:

- **Emirates**: Highest alignment with **16 total mentions** (GRI: 7, SASB: 3, TCFD: 6).
- **United Airlines**: Strong alignment with **13 mentions** (GRI: 6, SASB: 3, TCFD: 4).
- **American Airlines**: Notable alignment with **12 total mentions** (GRI: 6, SASB: 3, TCFD: 4).
- Remaining airlines (Delta, IAG, Lufthansa, Qantas, Air France-KLM, Turkish Airlines, Singapore Airlines) display lower or negligible explicit mentions, highlighting an opportunity or gap to increase explicit alignment and reporting clarity.

The varied adherence to recognized ESG frameworks highlights a significant transparency gap within airline sustainability reporting. Airlines explicitly aligning with established standards (such as Emirates and United Airlines) potentially benefit from enhanced credibility and stakeholder trust.

SUGGESTIONS

For airlines to effectively enhance ESG transparency and reporting, the following suggestions are recommended:

- Airlines should explicitly align reporting practices with internationally recognized frameworks (GRI, SASB, TCFD) to improve comparability and credibility.
- Enhance disclosure of Scope 3 emissions, interim targets, and third-party assurance to strengthen transparency and stakeholder trust.
- Industry bodies such as IATA and ICAO should encourage standardized ESG reporting guidelines, fostering consistency across the industry.
- Further research should explore regional differences influencing sustainability reporting practices to provide deeper context and recommendations tailored to different regulatory environments.

LIMITATIONS

This study provides valuable insights but has several limitations. First, it focuses exclusively on publicly available airline sustainability reports, potentially excluding internal practices or undisclosed sustainability efforts. Secondly, the sample includes only ten major global airlines, limiting generalizability across smaller or regional carriers. Thirdly, sentiment analysis using automated tools like

TextBlob may not fully capture contextual nuances or industry-specific jargon. Additionally, certain irregularities occurred during data capture; for example, the thematic analysis for Singapore Airlines produced anomalous results (displayed in Table 3) suggesting possible extraction or coding issues specific to this airline. Future studies should include manual checks alongside automated methods to validate findings comprehensively.

CONCLUSION

This study critically evaluated sustainability reports of ten major global airlines, applying comprehensive thematic, sentiment, clustering, and gap analyses. Findings indicate substantial variability in reporting comprehensiveness, tone, and alignment with ESG frameworks. While some airlines demonstrate leadership by transparently addressing environmental impacts and social initiatives, many show considerable gaps, especially concerning standardized reporting and Scope 3 disclosures. Addressing these gaps through standardized practices and explicit alignment with global frameworks is essential for airlines moving towards net-zero goals. This analysis contributes valuable benchmarks and insights, aiding stakeholders in understanding current sustainability practices and guiding future improvements within the aviation industry.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this work the author used ChatGPT in order to edit content. After using this tool/service, the author reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

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