



Sustainable Investment: Autonomous Hydrogen-Electric Cargo Aircraft

Value Net

Company International Consolidated Airlines Group S.A. (IAG). Formed in 2011. British-Spanish multinational airline holding company. Registered in Madrid, Spain. Headquarters: London, England. Main airline brands: British Airways, Iberia (Spain flag carrier), Aer Lingus (Ireland flag carrier), Vueling (Spain).

Customers Travelers: leisure, business, North Atlantic, global connectors; cargo transportation clients; focused markets through its brands

Collaborators Key subsidiaries; airlines through codeshare agreements and alliances like Oneworld; partnership with companies like Santander for its IAG Loyalty program

Competitors Large airline holding companies and individual airlines. Deutsche Lufthansa AG, Air France-KLM, Ryanair, United Airlines. Other significant competitors: Cathay Pacific Airways, Emirates, Turkish Airlines. Low-cost carriers: easyJet and Wizz Air

Climate Mixed opportunities and challenges. Strong demand recovery, particularly with leisure travel. Highly competitive. Economic volatility. Geopolitical instability (war in Ukraine, Middle East tensions). Sustainability and environmental regulations

Five Forces

New Entrants Low. Hard to enter global aviation market, brand loyalty

Buyer Power Moderately high. Highly price sensitive, especially leisure travelers. Switching costs, large scale infrequent purchases

Supplier Power High. 3000+ first-tier suppliers cover more than 70% of IAG's supplier footprint

Threat of Substitutes Moderate. 5 airline competitors and other travel means

Degree of Industry Rivalry High. Airlines compete for Boeing and Airbus manufacturing. Aviation industry among airlines is an oligopoly

Industry Outlook & Key Success Factors



Industry Dynamics

Estimated at \$810.1 billion in 2024, projected to reach \$1.72 trillion by 2034, growing at Compound Annual Growth Rate (CAGR) of 8.8%

Key Success Factors for Competitors

Operational excellence, strong financial management, effective marketing, strategic partnerships, focus on customer service and safety

SWOT



Strengths: strong brand portfolio with well-known airlines like British Airways and Iberia; extensive global network; operational scale; robust loyalty programs

Weaknesses: high dependence on the cyclical nature of the aviation industry; vulnerability to fluctuations in fuel prices; complexity of managing diverse airlines with various operational models

Opportunities: expanding into emerging markets; developing its digital transformation initiatives; leveraging strategic alliances and partnerships to enhance global reach

Threats: fluctuating fuel costs; sustainability and environmental concerns; geopolitical uncertainties; intense competition; economic downturns; regulatory changes; potential crises like pandemics or natural disasters

Negative Externality





Major environmental negative externality produced by IAG

Greenhouse Gas (GHG) Emissions contribute to Climate Change.

Impact and scope of the problem Impacts global warming, air quality, and the ecosystem

Scope 1: direct emissions from IAG sources, primarily from the combustion of jet fuel

Scope 2 and 3: indirect emissions

Quantity of the company's negative impact In 2024, IAG directly emitted 27.2 billion kg of Scope 1 CO₂e

How IAG benefits from producing this externality

Fossil fuel (primarily kerosene-based) has unique advantages: high energy density (crucial for powering large aircraft over long distances), safety and stability, availability, and compatibility with existing infrastructure

Key Issues

Economic Volatility + Cost Management



- Fluctuating fuel prices
- Inflation
- Supply chain disruption

Sustainability + Decarbonization



- Reduce carbon footprint
- More fuel efficient
- Sustainable aviation fuel

Labor shortage + Operational resilience



- Offset labor shortage by focusing on fleet renewal
- Optimize operations

Recommendations

- Modernize fleet
- Increase sustainable aviation fuel (SAF)
- Strengthen digital efficiency, including automation and A.I.



Proposal

Invest in autonomous hydrogen-electric aircraft for cargo transport.



Precedent

IAG has invested in developing autonomous hydrogen-electric aviation technology since 2020 (e.g., ZeroAvia).

Cargo investments have focused mostly on technology (e.g., drones and A.I.) and autonomous solutions for freight handling on the ground.

Issue Addressed

Hydrogen-electric, autonomous aircraft for cargo will improve IAG's environmental footprint.

- Significantly reduces its CO2 emissions
- Demonstrates a commitment to sustainability, a strong differentiator in an increasingly environmentally-conscious market
- Attracts customers and investors who prioritize greener solutions and help IAG comply with evolving environmental regulations



Strategic Advantages



- Competitive Advantage

- Technological advancement and innovation (early adoption and investment can position IAG as a leader in the aviation landscape, attracting top talent and influencing industry standards)
- Enhanced reliability and speed (quicker turnaround time for deliveries and higher customer satisfaction)
- Enhanced brand image

- Increased profitability

- Reduced operational costs (fuel consumption, maintenance)
- Expanded cargo network and routes (serve regional airports more efficiently)



Risks associated with this proposal

- Technological limitation
- High initial investment costs don't go down
- Cyberattacks of autonomous systems

What **assumptions** are predictions of success based on?

- Reduced cargo aircraft CO₂e emissions can reduce IAG's overall emissions
- Sustainable efforts enhance brand image, attracting more customers and talent
- Expanded network and routes generate revenue; reduced operational costs save money
- Regulations don't strongly inhibit the operation of the new aircraft

Metrics



To measure progress and success of the proposal

- Cost per Available Tonne Kilometer (CTK)--key measure of cost-efficiency
- Return on Investment (ROI)
- Total Cost of Ownership (TCO)
 - Comparing operational and maintenance costs of the new fleet with traditional alternatives
- Fuel Cell Efficiency and Cost
- Greenhouse Gas (GHG) Emission Reduction

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