2024 ICAO REGIONAL SEMINAR ON ENVIRONMENT

In collaboration with CAAT
สำนักงานการบินพลเรือนแห่งประเทศไทย
The Civil Aviation Authority of Thailand

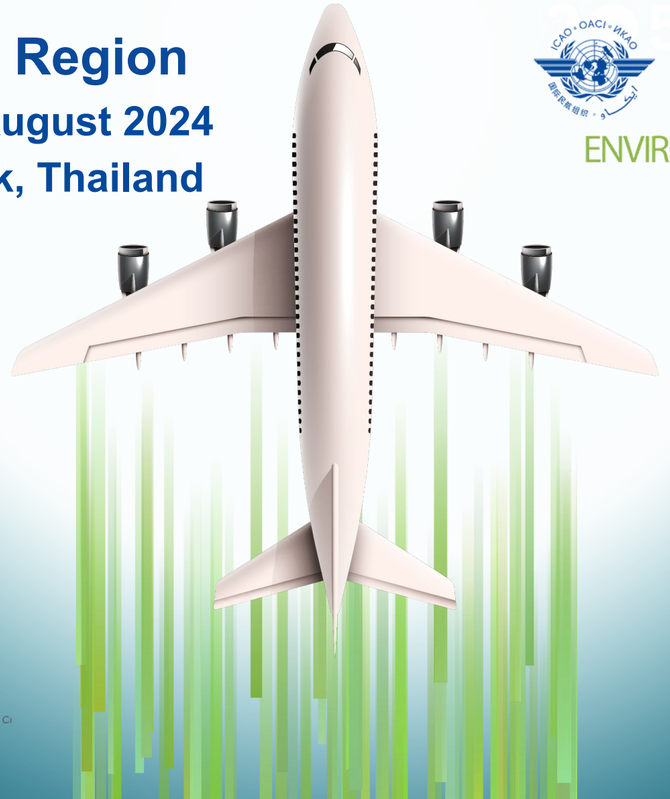
ACT SAF

CORSIA

APAC Region

7 to 8 , August 2024

Bangkok, Thailand



ICAO
ENVIRONMENT

CHALLENGES IN SAF FINANCING

From an Airline's Perspective

CORSIA COMPLIANCE

- Emissions cap lowered to 85% of 2019
- 126 States participating as of 1 Jan 2024
- **Offsetting expected to commence in 2024** under ALL ICAO traffic growth scenarios

- Transition towards cleaner energy using SAF or LCAF
- Global collective goal: 5% CO_2 reduction using SAF by 2030

COMPARATIVE PRICING

Price for 1 tonne of CO2 Equivalent	
CORSIA Eligible Credits	**SAF**
US$20	**~US$750**
37.5X More Expensive to decarbonise with SAF	

COST DRIVERS OF SAF

SAF adoption rates remain low because of **<u>demand and supply</u>** constraints

Supply	Demand
• Competition for known feedstock • Underdeveloped R&D for new feedstock • Difficulties to obtain sustainability certification • High investment barrier	• Non-transparent SAF pricing • Regulated airfares • High financing cost • Low consumer awareness

CAPEX COST COMPARISON

Plant			
Name	Neste, Singapore	LanzaJet, Georgia, USA	DG Fuels, Louisiana, USA
Technology	HEFA	Alcohol-to-Jet	Fischer-Tropsch
Feedstock	Used Cooking Oil	Agricultural waste, MSW	Biomass waste
Capacity (t/year)	1,000,000	30,000	600,000
Investment (US$)	1,700,000,000	200,000,000	4,000,000,000
Govt/ Development Grant Support		• Tax credit of US$ 1.25 to 1.75 per gallon of SAF • Microsoft Climate Fund (US$50m) • Breakthrough Energy (US$50m) • US Department of Energy (US$14m)	• US$ 2.15 billion loan guarantee from US Department of Energy
Private Sector Investments		• JV: Suncor Energy, LanzaTech & Mitsui • ANA, BA, Southwest • Airbus • Shell, MUFG	• Black & Veatch • Energy Vault • HydrogenPro • aviner & co., inc. • Chishima Real Estate Co., Ltd
Offtake Agreements	• DHL Express (5-year offtake for 0.3 mil tonnes of SAF) • Air New Zealand (7,000 tonnes SAF) • Singapore Airlines (1,000 tonnes SAF)	N/A	• Air-France KLM (10-year offtake for 0.6 mil tonnes of SAF) • Delta Airlines (7-year offtake for 1.1 mil tonnes of SAF)

WHAT IS EXPECTED OF AIRLINES?

	1	2	3	4
STRATEGIES	**Co-Invest in SAF refineries**	**Sign Offtake Agreements**	**Finance the Cost of SAF**	**Transfer Pricing to Consumers**
CHALLENGES	• Non-core business • High risk venture	• Pricing uncertainty • Policy uncertainty • Certification uncertainty	• Opportunity Cost of Financing New Fleet and Efficiency Upgrades • High cost of financing • Currency exposure	• Fare ceilings • Airfare disclosure regulations

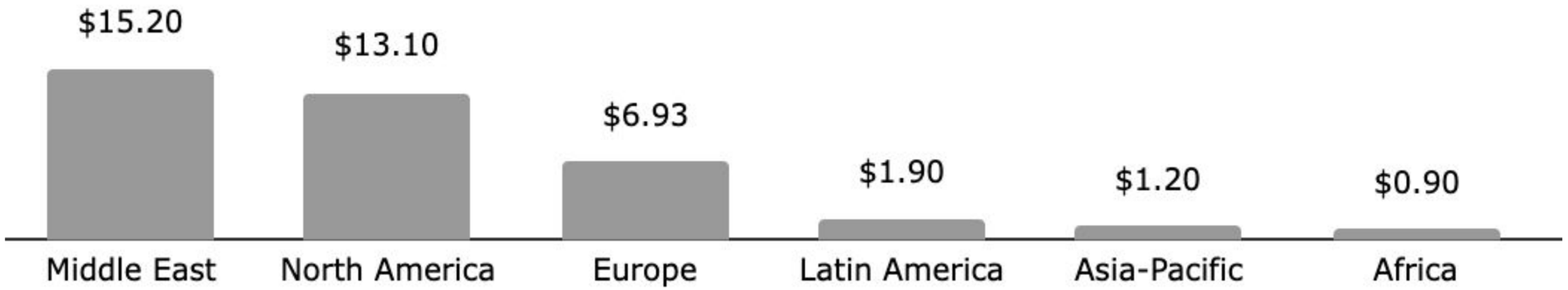
FORECASTED COST OF CARBON

Year	Annual Emissions Growth Rate	CORSIA Compliance Req	CAAF/3	Cost of Carbon (US$)	Cost per Pax per Hour (US$)
2024	-	4.4%	0.0%	$5,988,677	$0.05
2025	5%	5.7%	0.0%	$9,731,468	$0.07
2026	4%	6.6%	1.0%	$73,134,568	$0.52
2027	4%	13.0%	2.0%	$151,976,886	$1.04
2028	4%	14.4%	3.0%	$222,323,563	$1.45
2029	3%	15.1%	4.0%	$266,859,333	$1.68
2030	3%	16.6%	5.0%	$360,065,454	$2.21

Assumptions

- Baseline unchanged at 85% of 2019 levels
- Price of Carbon Credits starts at US$15/tonne, rising 20% each year
- SAF Price at 4x of Jet A1 in 2024, dropping to 3.4x of Jet A1 in 2029

AIRLINE PROFITABILITY OUTLOOK IN 2024



Region	Middle East	North America	Europe	Latin America	Asia-Pacific	Africa
Expected Net Profit Margin Per Pax*	$15.20	$13.10	$6.93	$1.90	$1.20	$0.90

Source: IATA Airline Profitability Outlook for 2024

Cost of CORSIA compliance + 1% SAF = $0.52 (43%)

Cost of CORSIA compliance + 5% SAF = $2.21 (-180%)

RANGE OF POLICIES TO DE-RISK SAF

- Infrastructure Grants and Incentives
- Tax Credits and related Incentives
- Loan Guarantees to Producers and Purchasers
- Continuous research, development and certification of new feedstock
- SAF Mandates
- National Carbon Policy supporting SAF use
- Carbon Pricing

CARBON FEE OUTLOOK

Singapore to impose green fuel levy on flights from 2026

By **Lisa Barrington** and **Brenda Goh**

February 19, 2024 6:54 PM GMT+8 · Updated 5 months ago

An Airbus A350-1000 flies during an aerial flying display ahead of the Singapore Airsh
18, 2024. REUTERS/Edgar Su/File Photo *Purchase Licensing Rights*

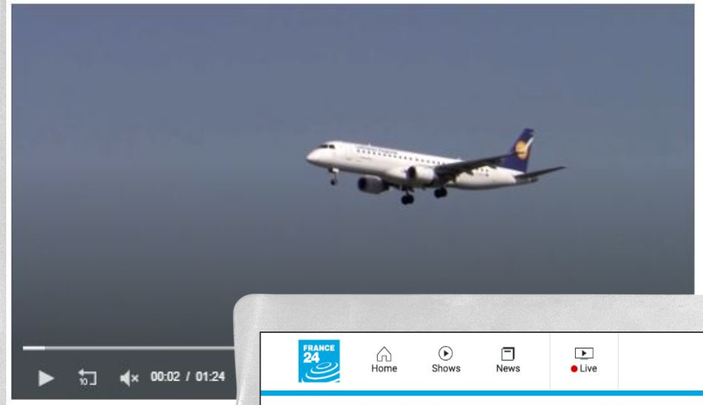
Summary | Companies

- Singapore to impose green fuel levy on departing flights
- Move from 2026 will raise ticket prices for travellers
- Aviation growth faces environmental challenges, says IATA

Lufthansa to raise fares by up to 72 euros as environmental costs increase

By **Joanna Plucinska** , **Ilona Wissenbach** and **Tim Hepher**

June 25, 2024 11:36 PM GMT+8 · Updated 21 days ago



Summary | Companies

- Airline to introduce 'Environm
- Fares to rise between 1 euro ar
- Air France-KLM has made a si

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Air France-KLM adds biofuel surcharge to plane tickets

Paris (AFP) – Air France-KLM said Monday it would add a surcharge of up to 12 euros ($13,50) on its tickets to try to offset the cost of using more expensive sustainable aviation fuel.

Issued on: 10/01/2022 - 14:28 Modified: 10/01/2022 - 14:27 1 min

The Switch

Norwegian Air to add environmental charge to fares, 'probably' in 2025

By **Agata Rybska**

July 12, 2024 6:57 PM GMT+8 · Updated 4 days ago

o Gardermoen airport, Norway Nove
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ECONOMY, CLIMATE, TOURISM

Brussels Airlines ticket prices to rise due to environmental surcharge

25 June 2024

German airline group Lufthansa is launching an environmental surcharge for all flights departing from Europe. The surcharge will apply on all the group's airlines, including Brussels Airlines.

Thank You

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