

think • go climate conscious



atmosfair Airline Index 2018



How is the Airline Index used?

1. Avoidance

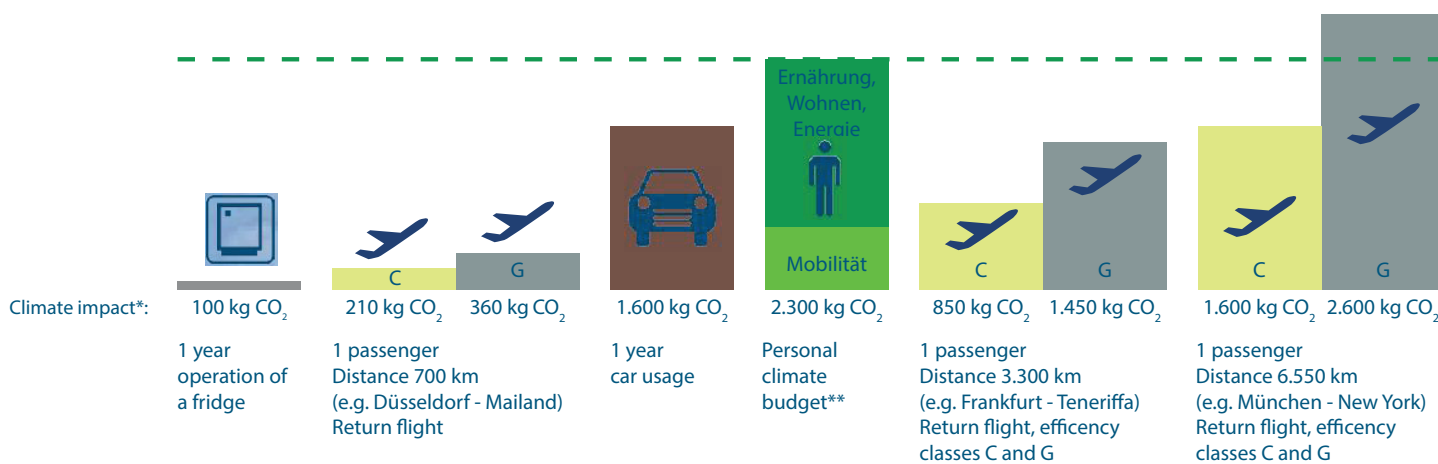
- Even efficient flights can quickly exceed a single person's annual climate CO₂ budget (see graphic).
- Are there alternatives available like the train?
- Have I chosen the direct flight? (Rule of thumb: a direct flight in Efficiency Class E is better for the climate than a transfer flight in Class C).

2. Optimization

- The airline index shows you the efficiency points of an airline for short, medium and long distance flights. First, ascertain your flight distance and then, in the appropriate distance class, the most efficient airline.
- The airline with the most efficiency points will generally also be the most efficient on your flight from point A to point B. Since deviations are possible, atmosfair offers companies that flight a lot a detailed ranking of airlines on specific city pairs, which are important for the company

3. Compensation

- atmosfair can offset the CO₂ emissions that you generate with your flight by building up and expanding the generation of renewable energies in the global south. Make your contribution to fighting global warming online at www.atmosfair.de



* Aircraft exhaust gases contain additional pollutants besides CO₂. Those other pollutants are converted to CO₂ equivalent emissions using the absolute global warming potential (AGWP) approach, with medium values and a 100 year time horizon. The AGWPs do not enter into the ranking of the airlines, since they are the same for all airlines.

** That is the amount of CO₂ that one human being can generate annually if global warming is to stay below the 2°C mark, provided the resulting world CO₂ budget were equally distributed among all humans. Transport accounts for about one quarter of current global CO₂ emissions.

References

Prof. Dr. Hartmut Graßl:

"With the airline index, atmosfair has built a bridge from science to practical climate protection in the important area of air transport."

Associate Prof. Paul Peeters, NHTV Breda University, Flugzeugingenieur:

"The AAI calculation method is precise and sets the standard for the environmental evaluation of aircraft"

Prof. Dr. Stefan Gössling, Lund University:

"The challenge of comparing airlines from a climate policy viewpoint has been convincingly scientifically solved by atmosfair."

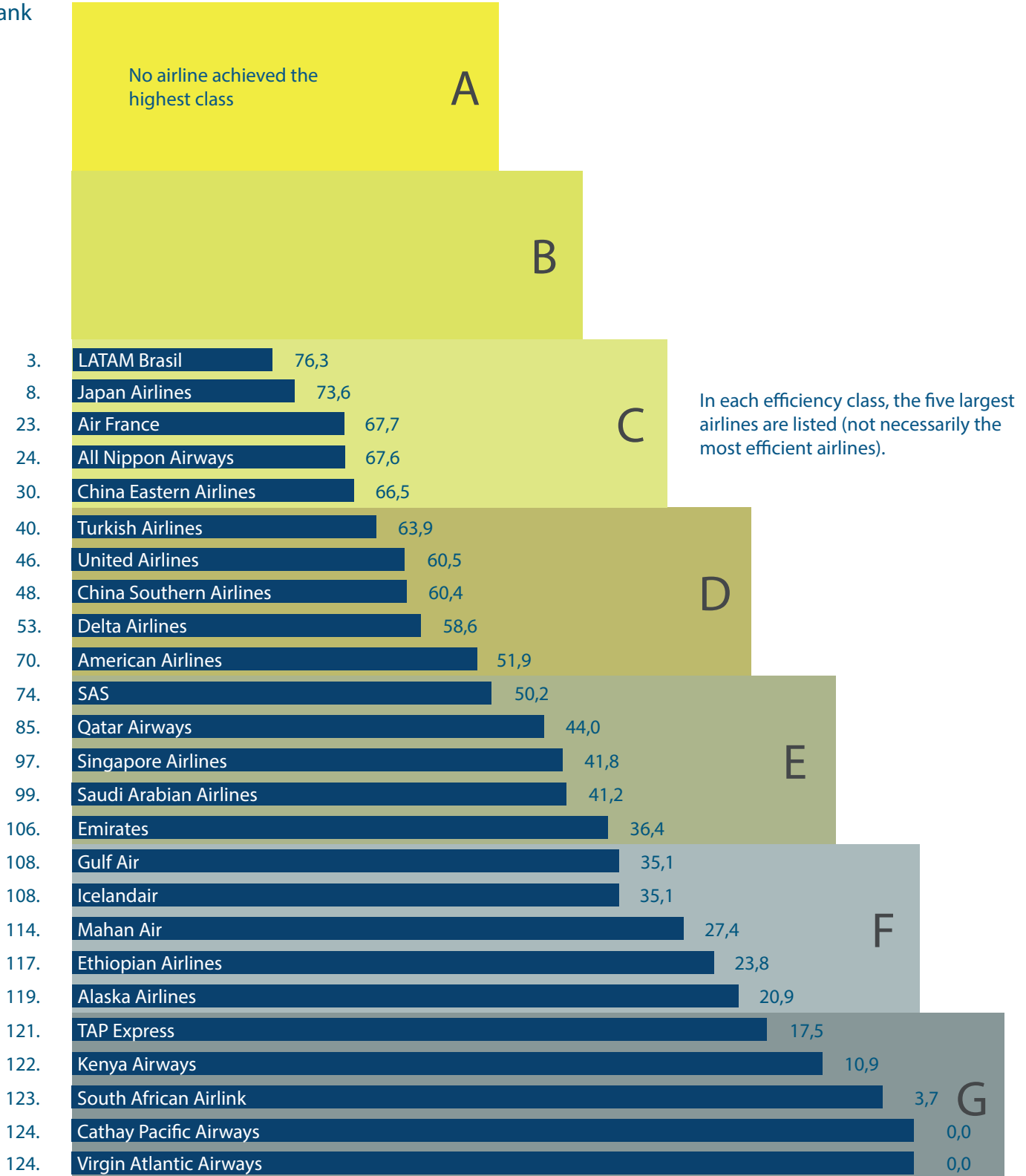
For corporates

The atmosfair airline ranking is available in detail even for single selected air routes. Because climate efficiency reduces fuel consumption, we can recommend airlines on the routes that are important to you, with which you can save both money and CO₂.

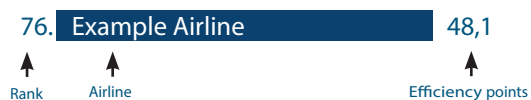
Ask us; we'll be happy to help you: airlineindex@atmosfair.de

AAI 2018 Evaluation of short haul flights (up to 800 km)

Rank



Legend

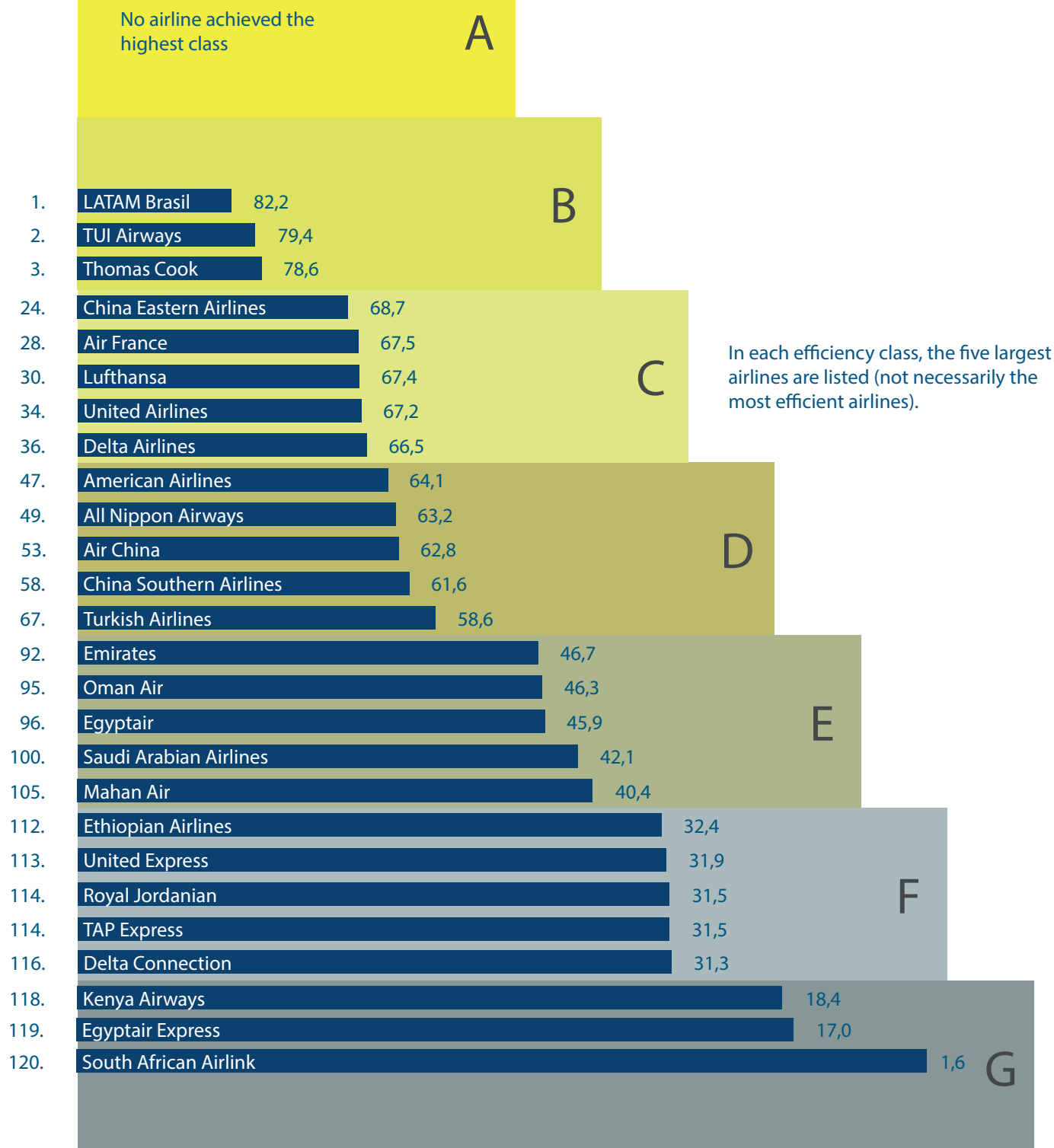


2016 Data

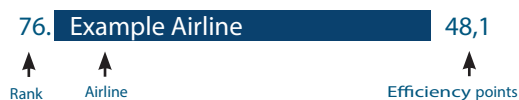
Accuracy of all airlines $\pm 1,5$ efficiency points

AAI 2018 Evaluation of medium haul flights (from 800km up to 3.800 km)

Rank



Legend

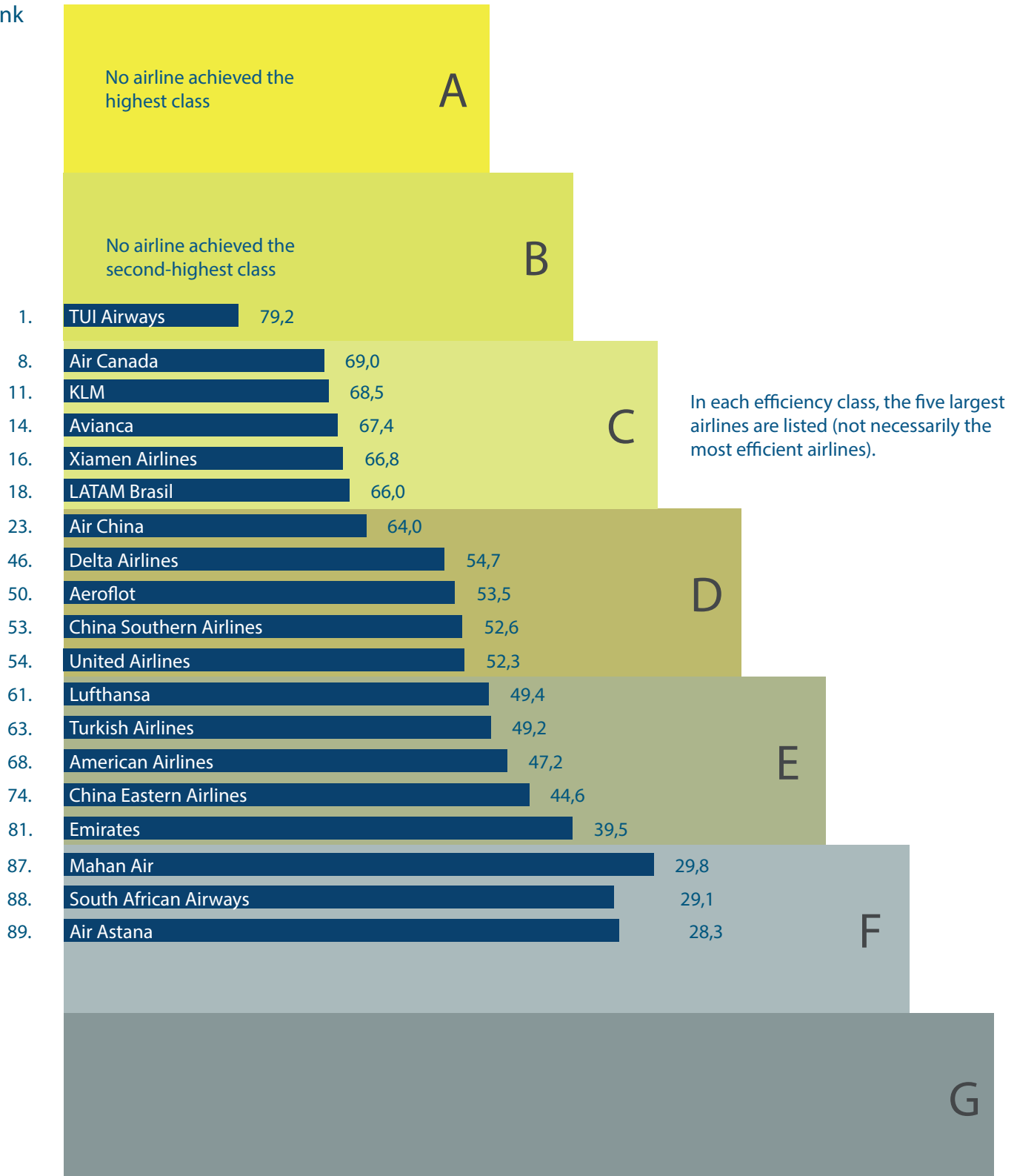


2016 Data

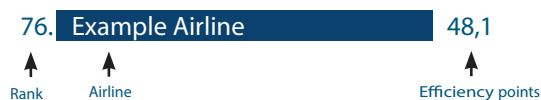
Accuracy of all airlines $\pm 1,5$ efficiency points

AAI 2018 Evaluation of long-haul flights (more than 3.800 km)

Rank



Legend



2016 Data

Accuracy of all airlines $\pm 1,5$ efficiency points

Ranking in detail (1)

Overall ranking							Distance-based ranking									
							<800 km			800-3800 km			>3800 km			
Rank	Airline	Country	EP* '18	EP* '17	EK*	Type*	Pax (in Mio.)*	EP*	EK*	Rank	EP*	EK*	Rank	EP*	EK*	Rank
1	TUI Airways	UK	79,3	78,9	B	Charter	10,9	69,1	C	17	79,4	B	2	79,2	B	1
2	LATAM Airlines Brasil¹	Brasilien	78,8	72,3	B	Net Carrier	33,8	76,3	C	3	82,2	B	1	66,0	C	18
3	China West Air	China	77,8	78,6	C	Regional	7,2	76,7	C	2	77,9	C	4			
4	TUIfly	Deutschland	77,6	78,2	C	Charter	4,6	72,9	C	10	77,7	C	5	76,3	C	3
5	Transavia.com France	Frankreich	76,3	-	C	Charter	5,1	77,8	C	1	76,3	C	7	73,8	C	4
6	SunExpress	Türkei	74,9	-	C	Charter	6,3	39,8	E	101	74,9	C	9			
7	Thomas Cook Airlines	UK	74,7	72,9	C	Charter	6,6	54,5	D	64	78,6	B	3	68,8	C	9
8	Air Europa Express	Spanien	73,4	-	C	Regional	0,2	73,4	C	9						
9	Condor Flugdienst	Deutschland	71,8	72,9	C	Charter	7,3	42,9	E	92	77,6	C	6	65,7	C	20
10	Juneyao Airlines	China	70,9	61,6	C	Net Carrier	13,3	69,4	C	15	71,0	C	15			
11	Jet2.com	UK	70,8	73,8	C	Charter	6,7	68,4	C	21	70,8	C	16	73,8	C	4
12	Air Europa	Spanien	70,7	65,6	C	Net Carrier	10,7	70,4	C	13	74,1	C	10	68,3	C	12
13	Air New Zealand	Neuseeland	70,5	60,8	C	Net Carrier	15,2	75,4	C	5	75,1	C	8	66,5	C	17
14	Vietnam Airlines	Vietnam	70,4	64,3	C	Net Carrier	20,6	63,9	D	40	69,3	C	22	76,9	C	2
15	Beijing Capital Airlines	China	69,8	58,1	C	Net Carrier	13,1	68,7	C	18	70,0	C	18			
16	Siberia Airlines²	Russland	69,2	65,6	C	Net Carrier	9,5	66,2	C	33	69,7	C	20	67,4	C	14
17	KLM	Niederlande	68,9	68,1	C	Net Carrier	30,4	64,8	D	37	71,6	C	13	68,5	C	11
18	Virgin Australia International	Australien	68,5	67,0	C	Net Carrier	19,7	71,6	C	11	69,8	C	19	61,4	D	31
19	Air New Zealand Link	Neuseeland	68,3	64,4	C	Regional	3,0	68,5	C	19	62,9	D	52			
20	Air Caraibes	Guadeloupe	68,2	-	C	Net Carrier	1,4	74,0	C	7	70,3	C	17	67,6	C	13
21	Avianca	Kolumbien	67,9	61,7	C	Net Carrier	29,5	67,9	C	22	68,2	C	26	67,4	C	14
22	Alaska Airlines	USA	67,4	67,6	C	Net Carrier	24,4	20,9	F	119	67,3	C	31	70,2	C	7
22	Shandong Airlines	China	67,4	55,8	C	Net Carrier	18,6	68,5	C	19	67,3	C	31			
22	Sichuan Airlines	China	67,4	65,6	C	Net Carrier	23	64,5	D	38	68,5	C	25	48,6	E	65
22	Thai Airways International	Thailand	67,4	65,3	C	Net Carrier	18,2	70,8	C	12	69,6	C	21	65,8	C	19
26	Air Transat	Kanada	67,1	65,7	C	Charter	4,4	67,0	C	26	71,3	C	14	64,5	D	22
27	UTair Aviation	Russland	66,9	46,5	C	Net Carrier	6,7	70,1	C	14	66,3	C	37	68,6	C	10
28	Air India Express	Indien	66,8	-	C	Regional	3,2	38,9	E	103	67,1	C	35			
29	Hong Kong Airlines	Hong Kong	66,2	61,7	C	Net Carrier	6,5	74,3	C	6	66,2	C	38	61,7	D	29
30	Shenzhen Airlines	China	66,1	65,7	C	Net Carrier	27,6	66,7	C	27	66,1	C	40			
31	Xiamen Airlines Company	China	66,0	53,8	C	Net Carrier	24,5	66,6	C	28	65,8	C	43	66,8	C	16
32	Air Canada	Kanada	65,6	55,5	C	Net Carrier	44,8	57,7	D	55	63,2	D	49	69,0	C	8
32	Hainan Airlines	China	65,6	60,6	C	Net Carrier	27,4	69,2	C	16	66,2	C	38	61,8	D	27
34	Iberia	Spanien	65,0	59,8	C	Net Carrier	17,8	66,5	C	30	67,9	C	27	58,9	D	35
35	Ural Airlines	Russland	64,9	55,1	D	Net Carrier	6,5	62,3	D	43	66,0	C	42	58,6	D	36
36	Finnair	Finnland	64,4	57,4	D	Net Carrier	10,9	61,7	D	44	67,5	C	28	61,9	D	26
37	China Eastern Airlines	China	64,0	59,5	D	Net Carrier	80,9	66,5	C	30	68,7	C	24	44,6	E	74
38	Japan Airlines	Japan	63,9	53,1	D	Net Carrier	32,9	73,6	C	8	72,3	C	11	53,9	D	48
39	Air India	Indien	63,4	57,4	D	Net Carrier	19,8	59,7	D	51	65,3	C	45	61,8	D	27
40	El Al Israel Airlines	Israel	63,2	54,8	D	Net Carrier	5,5	66,1	C	34	67,3	C	31	56,1	D	41
41	Air China	China	63,1	58,0	D	Net Carrier	62,4	64,2	D	39	62,8	D	53	64,0	D	23
42	Batik Air	Indonesien	62,5	-	D	Net Carrier	7,6	61,2	D	45	62,8	D	53	62,2	D	25
43	Royal Air Maroc Express	Marokko	62,3	57,0	D	Regional	0,5	65,5	C	35	53,9	D	78			
44	Garuda Indonesia	Indonesien	61,9	58,8	D	Net Carrier	23,9	65,2	C	36	62,8	D	53	57,5	D	37
45	Cathay Pacific Airways	Hong Kong	61,8	63,2	D	Net Carrier	24,4	0,0	G	124	66,1	C	40	60,1	D	33
45	Delta Airlines	USA	61,8	59,7	D	Net Carrier	183,7	58,6	D	53	66,5	C	36	54,7	D	46
47	Corsair	France	61,6	60,7	D	Charter	1,2	35,5	F	107	56,9	D	73	61,6	D	30
48	TAP Portugal	Portugal	61,5	61,5	D	Net Carrier	11,7	45,9	E	84	65,2	C	46	56,9	D	38
49	Qantas Airways	Australien	61,4	58,2	D	Net Carrier	28,2	75,8	C	4	72,3	C	11	48,8	E	64
50	Aerolineas Argentinas	Argentinien	60,4	58	D	Net Carrier	8,3	67,1	C	25	63,8	D	48	53,5	D	50
50	United Airlines	USA	60,4	59,7	D	Net Carrier	143,2	60,5	D	46	67,2	C	34	52,3	D	54
52	China Southern Airlines	China	60,3	59,3	D	Net Carrier	84,9	60,3	D	48	61,6	D	58	52,6	D	53
53	TianJin Airlines	China	60,0	48,9	D	Regional	12,1	56,1	D	59	62,3	D	56	51,2	D	57
54	Icelandair	Island	59,9	60,4	D	Net Carrier	3,7	35,1	F	108	60,3	D	62	59,6	D	34
55	Shanghai Airlines	China	59,8	59,0	D	Net Carrier	14,3	60,0	D	50	59,9	D	64	56,9	D	38
56	Cathay Dragon	Hong Kong	59,6	-	D	Net Carrier	9,9	55,9	D	61	60,1	D	63	55,3	D	44
57	Hawaiian Airlines	USA	59,0	57,0	D	Net Carrier	11,1	51,6	D	71				60,3	D	32
58	American Airlines	USA	58,7	55,1	D	Net Carrier	198,7	51,9	D	70	64,1	D	47	47,2	E	68
58	MASwings	Malaysia	58,7	56,8	D	Regional	1,4	58,7	D	52						
58	Ukraine Int. Airlines	Ukraine	58,7	55,9	D	Net Carrier	6,0	41,0	E	100	61,2	D	59	56,3	D	40

*EP: Efficiency points; EK: Efficiency class; Pax: Number of passengers (data from Air Transport Intelligence, a service of ICAODATA.com, IATA WATS, and other sources); Type: The division of the airlines in categories was based on Air Transport Intelligence and other sources. In the event of ties, airlines are listed alphabetically.

The following airlines were not evaluated due to data gaps: Gol, Anadolu Jet, Travel Service Airlines, Globus.

¹ also TAM Linhas Aereas

² also S7 Airlines

Overall ranking

Rank	Airline	Country	EP* '16	EP* '15	EK*	Type*	Pax (in Mio.)*
61	All Nippon Airways	Japan	58,4	48,1	D	Net Carrier	52,1
61	Malaysia Airlines	Malaysia	58,4	45,5	D	Net Carrier	13,9
63	Copa Airlines	Panama	58,2	54,8	D	Net Carrier	8,5
64	Aeromexico	Mexico	58,1	50,2	D	Net Carrier	11,2
65	Alitalia	Italien	57,2	57,8	D	Net Carrier	23,1
66	Lufthansa	Deutschland	56,9	55,2	D	Net Carrier	62,4
67	Singapore Airlines	Singapore	56,5	35,1	D	Net Carrier	19,0
68	Aeroflot Russian Airlines	Russland	56,4	55,7	D	Net Carrier	39,2
69	Turkish Airlines	Türkei	56,2	59,4	D	Net Carrier	62,8
70	Asiana Airlines	Südkorea	56,1	53,1	D	Net Carrier	19,3
71	Korean Air	Südkorea of	55,9	49,3	D	Net Carrier	26,9
72	Srilankan Airlines	Sri Lanka	55,6	56,0	D	Net Carrier	4,4
73	Air France	Frankreich	54,5	55,0	D	Net Carrier	49,8
74	British Airways	UK	54,4	51,7	D	Net Carrier	44,5
75	Iberia Regional	Spanien	54,3	51,3	D	Regional	2,2
76	Royal Air Maroc	Marokko	54,0	45,3	D	Net Carrier	6,8
77	QantasLink	Australien	53,6	59,9	D	Regional	6,2
78	SAS Scandinavian Airlines	Schweden	53,4	52,0	D	Net Carrier	29,4
79	EVA Airways	Taiwan	53,2	62,1	D	Net Carrier	11,2
79	SilkAir	Singapore	53,2	56,3	D	Regional	4,1
81	Austrian Airlines	Österreich	51,6	51,6	D	Net Carrier	11,4
82	China Airlines	Taiwan	51,4	57,5	D	Net Carrier	14,7
83	Virgin Atlantic Airways	UK	51,3	40,9	D	Net Carrier	5,4
84	Brussels Airlines	Belgium	50,5	49,0	E	Net Carrier	7,7
85	South African Express	Südafrika	50,3	41,6	E	Regional	0,3
86	Air Algerie	Algerien	50,2	-	E	Net Carrier	6,1
87	Pakistan Int. Airlines	Pakistan	50,1	52,5	E	Net Carrier	5,5
87	Philippine Airlines	Philippinen	50,1	50,1	E	Net Carrier	13,4
89	Swiss	Schweiz	49,7	46,8	E	Net Carrier	18,0
90	Alaska Horizon	USA	49,5	48,9	E	Regional	7,8
91	Jazz Aviation	Kanada	49,1	45,6	E	Regional	10,5
92	PAL Express	Philippinen	48,8	49,5	E	Regional	5,1
93	ANA Wings	Japan	48,6	49,6	E	Regional	0,2
94	Nordic Regional Airlines	Finland	48,3	44,3	E	Regional	2,8
95	Gulf Air	Bahrain	47,3	44,2	E	Net Carrier	5,2
96	Etihad Airways	VAE	47,2	49,8	E	Net Carrier	18,5
97	LOT - Polish Airlines	Polen	47,0	44,2	E	Net Carrier	5,5
98	Flybe	UK	46,8	48,5	E	Regional	8,4
99	Lufthansa Regional	Deutschland	46,7	46,8	E	Regional	5,1
100	Qatar Airways	Qatar	46,4	46,1	E	Net Carrier	32
101	Egyptair	Ägypten	44,7	41,1	E	Net Carrier	8,2
102	BA CityFlyer	UK	43,6	39,7	E	Regional	2,2
103	Oman Air	Oman	43,4	40,5	E	Net Carrier	7,7
104	HOP!	France	42,9	-	E	Regional	6,0
104	Kuwait Airways	Kuwait	42,9	42,2	E	Net Carrier	2,9
106	Ohana by Hawaiian	USA	42,8	38,8	E	Regional	0,4
107	J-Air	Japan	41,1	41,3	E	Regional	3,5
108	Emirates	VAE	40,7	39,6	E	Net Carrier	56,1
109	Swiss Global Air Lines	Schweiz	40,3	46,8	E	Regional	1,1
110	Saudi Arabian Airlines	Saudi-Arabien	40,2	40,3	E	Net Carrier	28,2
111	South African Airways	Südafrika	39,5	41,4	E	Net Carrier	6,6
112	Aeromexico Connect	Mexico	38,6	30,6	E	Regional	8,5
113	Austral Lineas Aereas	Argentinien	37,7	33,2	E	Regional	3,2
114	Royal Jordanian	Jordanien	37,4	34,7	E	Net Carrier	3,0
115	Ethiopian Airlines	Äthiopien	36,5	26,5	E	Net Carrier	8,2
116	Virgin Australia Regional	Australien	36,0	40,4	E	Regional	4,6
117	Air Astana	Kasachstan	34,8	36,0	F	Net Carrier	3,7
118	Mahan Air	Iran	33,9	39,0	F	Net Carrier	5,9
119	United Express	USA	31,1	32,0	F	Regional	22,0
120	TAP Express	Portugal	30,6	37,0	F	Regional	1,3
121	Delta Connection	USA	28,5	29,5	F	Regional	39,0
122	Envoy	USA	28,2	32,8	F	Regional	11,8
123	Kenya Airways	Kenia	27,6	19,5	F	Net Carrier	4,5
124	Egyptair Express	Ägypten	25,4	22,0	F	Regional	1,2
125	South African Airlink	Südafrika	2,3	2,6	G	Regional	0,50,5

Distance-based ranking

<800 km			800-3800 km			>3800 km		
EP*	EK*	Rank	EP*	EK*	Rank	EP*	EK*	Rank
67,6	C	24	63,2	D	49	50,5	E	59
52,2	D	68	61,8	D	57	54,2	D	47
43,7	E	87	54,5	D	76	64,7	D	21
56,1	D	59	56,2	D	74	63,1	D	24
60,5	D	46	60,7	D	61	52,2	D	55
58,1	D	54	67,4	C	30	49,4	E	61
41,8	E	97	61,1	D	60	55,5	D	43
52,7	D	66	57,8	D	70	53,5	D	50
63,9	D	40	58,6	D	67	49,2	E	63
66,3	C	32	58,3	D	68	50,2	E	60
66,6	C	28	63,1	D	51	50,6	E	58
57,3	D	58	57,8	D	70	53,2	D	52
67,7	C	23	67,5	C	28	46,4	E	70
57,6	D	56	65,8	C	43	47,6	E	67
55,9	D	61	50,4	E	87			
42,2	E	96	53,9	D	78	55,7	D	42
55,8	D	63	46,5	E	94			
50,2	E	74	59,3	D	65	44,7	E	72
52,0	D	69	58,7	D	66	49,4	E	61
42,7	E	94	54,0	D	77			
43,3	E	90	53,2	D	81	54,9	D	45
49,7	E	76	53,7	D	80	48,4	E	66
0,0	G	124				51,4	D	56
48,8	E	80	53,2	D	81	46,6	E	69
52,5	D	67	43,7	E	99			
57,6	D	56	49,6	E	90	44,8	E	71
43,3	E	90	58,0	D	69	38,2	E	84
51,5	D	72	57,2	D	72	37,1	E	85
60,1	D	49	69,0	C	23	38,5	E	83
49,0	E	78	50,3	E	88			
51,3	D	73	47,3	E	91			
48,4	E	82	51,1	D	86			
49,1	E	77	44,0	E	98			
63,9	D	40	36,6	E	110			
35,1	F	108	52,7	D	83	41,6	E	77
49,8	E	75	55,8	D	75	44,1	E	75
43,6	E	88	38,2	E	106	70,6	C	6
48,6	E	81	41,3	E	101			
43,9	E	86	50,0	E	89			
44,0	E	85	51,7	D	85	44,7	E	72
49,0	E	78	45,9	E	96	40,1	E	80
42,3	E	95	44,7	E	97			
38,4	E	104	46,3	E	95	40,5	E	79
46,7	E	83	38,0	E	107			
43,5	E	89	46,7	E	92	38,7	E	82
42,8	E	93						
41,3	E	98	40,5	E	104			
36,4	E	106	46,7	E	92	39,5	E	81
39,4	E	102	40,9	E	102			
41,2	E	99	42,1	E	100	36,9	E	86
53,9	D	65	51,9	D	84	29,1	F	88
34,1	F	110	40,9	E	102			
37,3	E	105	37,8	E	108			
20,2	F	120	31,5	F	114	53,9	D	48
23,8	F	117	32,4	F	112	40,8	E	78
33,7	F	111	36,2	E	111			
26,9	F	115	37,5	E	109	28,3	F	89
27,4	F	114	40,4	E	105	29,8	F	87
29,2	F	112	31,9	F	113			
17,5	G	121	31,5	F	114			
21,6	F	118	31,3	F	116			
25,0	F	116	30,3	F	117			
10,9	G	122	18,4	G	118	43,3	E	76
28,3	F	113	17	G	119			
3,7	G	123	1,6	G	120			

* EP: Efficiency points; EK: Efficiency class; Pax: Number of passengers (data from Air Transport Intelligence, a service of ICAOData.com, IATA WATS, and other sources); Type: The division of the airlines in categories was based on Air Transport Intelligence and other sources. In the event of ties, airlines are listed alphabetically.

Ranking Charter Carrier

Rank	Airline	Land	Efficiency Class	Efficiency Points 2018	Efficiency Points 2017	Efficiency Points 2016	Type	Pax (in Mio.)
1	TUI Airways	UK	B	79,3	--	--	Charter	10,6
2	TUIfly	Germany	C	77,6	78,2	82,8	Charter	8,0
3	Transavia.com France	France	C	76,3	--	--	Charter	0,7
4	SunExpress	Turkey	C	74,9	--	--	Charter	5,7
5	Thomas Cook Airlines	UK	C	74,7	72,9	79,4	Charter	5,9
6	Condor Flugdienst	Germany	C	71,8	72,9	78,7	Charter	6,9
7	Jet2.com	UK	C	70,8	73,8	75,1	Charter	6,4
8	Air Transat	Canada	C	67,1	65,7	75,7	Charter	7,6
9	Corsair	France	D	61,6	60,7	66,4	Charter	2,4

Ranking Regional Carrier

Rank	Airline	Country	Efficiency Class	Efficiency Points 2018	Efficiency Points 2017	Efficiency Points 2016	Type	Pax (in Mio.)
1	China West Air	China	C	77,8	78,6	83,1	Regional	7,2
2	Air Europa Express	Spain	C	73,4	--	--	Regional	0,2
3	Air New Zealand Link	New Zealand	C	68,3	64,4	72,0	Regional	3,0
4	Air India Express	India	C	66,8	--	--	Regional	3,2
5	Royal Air Maroc Express	Marocco	D	62,3	57,0	65,5	Regional	0,5
6	TianJin Airlines	China	D	60	48,9	61,2	Regional	12,1
7	MASwings	Malaysia	D	58,7	56,8	72,0	Regional	1,4
8	Iberia Regional	Spain	D	54,3	51,3	54,6	Regional	2,2
9	QantasLink	Australia	D	53,6	59,9	63,4	Regional	6,2
10	SilkAir	Singapur	D	53,2	56,3	60,0	Regional	4,1
11	South African Express	South Africa	E	50,3	41,6	51,3	Regional	0,3
12	Alaska Horizon	USA	E	49,5	48,9	61,3	Regional	7,8
13	Jazz Aviation	Canada	E	49,1	45,6	58,3	Regional	10,5
14	PAL Express	Philippines	E	48,8	49,5	--	Regional	5,1
15	ANA Wings	Japan	E	48,6	49,6	55,7	Regional	0,2
16	Nordic Regional Airlines	Finland	E	48,3	44,3	50,4	Regional	2,8
17	Flybe	UK	E	46,8	--	--	Regional	8,4
18	Lufthansa Regional	Germany	E	46,7	46,8	49,3	Regional	5,1
19	BA CityFlyer	UK	E	43,6	39,7	48,8	Regional	2,2
20	HOP!	France	E	42,9	--	--	Regional	6,0
21	Ohana by Hawaiian	USA	E	42,8	38,8	53,3	Regional	0,4
22	J-Air	Japan	E	41,1	41,3	46,2	Regional	3,5
23	Swiss Global Air Lines	Switzerland	E	40,3	46,8	--	Regional	1,1
24	Aeromexico Connect	Mexico	E	38,6	30,6	53,9	Regional	8,5
25	Austral Lineas Aereas	Argentina	E	37,7	33,2	40,4	Regional	3,2
26	Virgin Australia Regional	Australia	E	36,0	40,4	--	Regional	4,6
27	United Express	USA	F	31,1	32,0	41,1	Regional	22,0
28	TAP Express	Portugal	F	30,6	37,0	42,3	Regional	1,3
29	Delta Connection	USA	F	28,5	29,5	37,4	Regional	39,0
30	Envoy	USA	F	28,2	32,8	38,5	Regional	11,8
31	Egyptair Express	Egypt	F	25,4	22,0	--	Regional	1,2
32	South African Airlink	South Africa	G	2,3	2,6	--	Regional	0,5

The Low Cost or so-called budget airlines (LCC) have purposely been included in this airline index in a different kind of illustration. They have to be considered separately, since they raise methodological issues in total CO₂ calculation and representation, which renders them not-comparable to other airlines. However, at least the direct CO₂ emissions of the LCCs can be calculated. In order to not withhold this information from flight passengers, LCCs are thus represented here in a more approximate form, which balances known with unknown parameters, as discussed below.

The methodological issues include:

1. Subsidies:

Many, though not all, budget airlines receive subsidies, and hence generate flights which they could not otherwise have offered at such low prices. These subsidies thus stimulate flights and subsequently emissions of CO₂, which would need also be assigned to the climate account of the subsidized airlines, but which cannot be calculated by the Airline Index. Other airlines benefit from subsidies as well, but they do not convert those subsidies equally into cheaper fares and thus more CO₂.

2. Detours:

Many budget airlines fly to and from regional airports. However, the ground travel required to get to these airports is generally longer than in the case of hub to hub flights. These longer ground transport distances cause additional CO₂, which must be incorporated into the ranking.

Note: not all budget airlines are alike. atmosfair has assumed the definition and categorization of airlines as “Low Cost airlines” from the ATI, the service provider for the international civil air transport organization ICAO. The definition is given in the complete documentation of the methodology, which can be downloaded from the atmosfair website.

Low Cost Carrier ¹		
Efficiency Class	Type	Airlines
A	Low Cost Carrier	----
B	Low Cost Carrier	IndiGo Air, Indonesia AirAsia, Lion Air, Norwegian, Ryanair, Scoot, SpiceJet, Spring Airlines, Transavia.com
C	Low Cost Carrier	Aer Lingus, Air Arabia, AirAsia, China United Airlines, Citilink Indonesia, Easyjet, Eurowings, Frontier Airlines, germanwings, Go Air, Jeju Airlines, Jetstar Airways, Lucky Air, Nok Air, Pegasus Airlines, Southwest Airlines, Spirit Airlines, Thai AirAsia, Tigerair Taiwan, VietJet Air, Volaris, Vueling, Wizz Air
D	Low Cost Carrier	Airasia X, Allegiant Air, Azul Airlines, Cebu Pacific Air, Flydubai, JetBlue Airways, Virgin America, Westjet
E	Low Cost Carrier	Interjet
F	Low Cost Carrier	----
G	Low Cost Carrier	----

¹ In alphabetical order within one efficiency class

Where do particular airlines win or lose efficiency points?

The following brief characterization¹ addresses important factors which help determine the results of an airline. We will limit ourselves to the factors aircraft type, seating capacity and load factor. The last two factors yield the number of passengers carried. These factors and their weighting in the evaluation are not stipulated by the AAI, but is calculated from the physical values for these factors which actually occur for each airline.

Airlines which achieve the best results are those using modern equipment, having high seating density and high rates of passenger occupancy and load utilization. That means for one thing that those airlines with high rates of occupancy carry passengers most efficiently if they have maximum seat density. Airlines have differing priorities in optimizing their service to their customers. Atmosfair does not evaluate these priorities, but it does evaluate the CO₂ emissions associated with them.

TUI Airways (formerly Thomson Airways)	Best charter airline worldwide. Flies consistently with highly efficient aircraft (e.g., B737-800). Seating reaches almost maximum capacity. Combined with very high occupancy rates, even compared to the previous year, TUI Airways scores winning points.
China West Air	Chinese regional airline, serves only short and medium-distance routes with efficient aircraft (A320 family). Achieved the top ranking by means of very dense seating and very high occupancy levels.
TUIfly	Flies consistently with efficient aircraft (e.g. B737-800). Aircrafts are seated close to capacity. In combination with high occupancy (though lesser than last year) this leads to an international top ranking.
Condor	Uses efficient aircraft (e.g., A320, B757). The aircrafts are tightly seated. Condor gains points through the high occupancy levels, especially on the medium-distance routes.
LATAM Airlines	Fleet with efficient aircraft (e.g., A320, A330, B777), slightly more seating than average. In combination with an increased occupancy level on short and medium-distance routes, LATAM scores once again.
Lufthansa	Lufthansa does not exploit the maximum potential due to seating below average. It operates with modern aircraft models on the short and medium haul routes (including the A320) and overall increases again CO ₂ efficiency despite slightly lower occupancy. On long-haul routes, Lufthansa continues to add more modern wide-body jets to the fleet (A330, A380, B747-8I), while it still foregoes efficiency points due to the below average seating.
American Airlines	Fleet consists mostly of efficient aircraft (e.g. A320, B737-800, B777) and partly of inefficient aircraft (e.g. MD-80), which operate especially on medium-haul flights. Medium-haul fleet seating is average; long-haul fleet seating is slightly below average. American Airlines still earns points compared to the previous year due to high occupancy on long-haul flights in combination with more efficient aircrafts.
Emirates	Fleet comprises modern jets (including B777, A330, A380). However, these WideBody Jets are seated below average and thus more inefficient compared to NarrowBody jets seated below average. Occupancy increased slightly compared to the previous year, earning Emirates additional points.
Finnair	The fleet consists for the most part of efficient aircraft (including A350-900). Short and medium-haul fleet average, long-haul fleet slightly below average seating. Due to the average capacity Finnair loses efficiency points on short- and medium-haul routes, on long-haul routes despite slightly above-average occupancy due to the below-average seating.
Air Europa	Fleet of efficient aircraft. Short- and medium-haul fleet tightly seated, long-haul fleet slightly above average seating. Loses efficiency points due to only average occupancy, especially on the long haul.
Thai Airways	The fleet consists mainly of efficient airplanes (for example A350, B777) and, to a lesser extent, more inefficient aircraft (for example B747). Earns points through slightly above-average seating and above-average occupancy.
All Nippon Airways	For the most part, the fleet consists of efficient airplanes, which are, however, seated under average. Despite slightly above-average and improved occupancy All Nippon Airways especially loses points on the long haul.

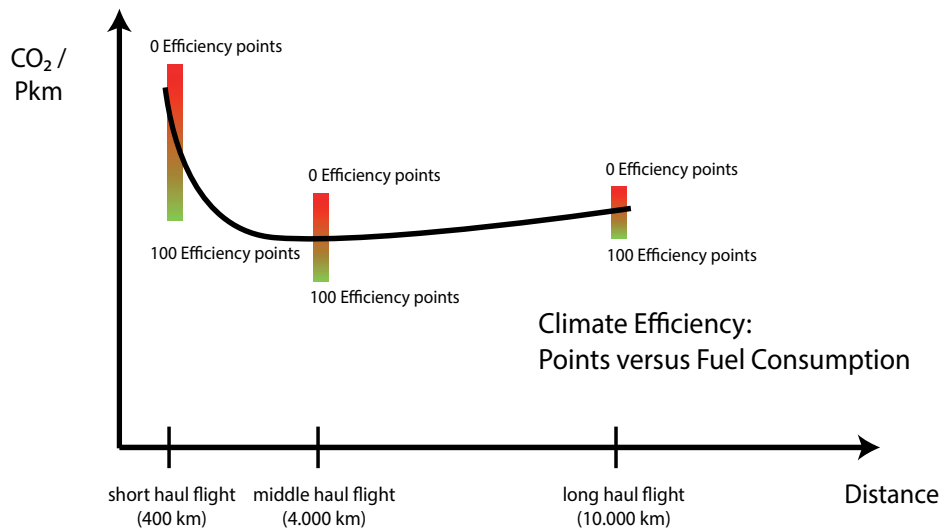
¹ The selection made here does not represent any value.

² A WideBody jet has a fuselage wide enough to accommodate two passenger aisles. NarrowBody Jets only have space for a single aisle..

Background: How to rank unbiasedly short vs. long haul flights

Car drivers are used to easy and absolute climate efficiency indicators: grams CO₂ per kilometer or gallons per mile. This is not the case for aircraft: Every plane has to take off and climb out to a minimum altitude, regardless of how far it goes after that.

For these reasons, CO₂ emissions per passenger and kilometer will always be higher on a short distance flight than on medium-distance flights, just due to flight physics. On long haul flights specific emissions raise again, since the fuel used at the end



Source: atmosfair

Figure 1 shows average CO₂ emissions per passenger and kilometer as a function of the flight distance (full curve). For typical short, medium and long haul distances, three bars show the range of CO₂ efficiencies of planes from the real airlines covered in the AAI. The lower end of the bar marks the best CO₂ efficiency that can be achieved on this distance, the upper end the inefficient end. The following can be seen immediately from the graph:

- A slightly inefficient medium-haul flight is still more efficient than the most efficient short distance flight (lower end of the short-distance bar)
- An average efficient medium distance flight is as efficient as the most efficient long-haul flight.

This shows that absolute indicators such as g CO₂ per passenger kilometre do not tell much about the climate efficiency of an airline. A long haul airline with specific emissions of 120 g CO₂ per passenger kilometre may be closer to the achievable optimum than the 75 g CO₂ fleet of a medium-haul airline. In this case, the long-haul carrier would be discriminated by using absolute efficiencies, and the potential efforts of the airline would not be appreciated adequately.

The Airline Index provides undistorted comparison: 100 efficiency points mark the optimum already achievable today

The Airline Index is thus based upon an innovative methodology, which cures this distortion: The AAI compares the CO₂ emissions of airlines on the same city pairs (e.g. Paris -London) and thus at equal distances. Only in a second step these city pair efficiency results are added up to global efficiency points for an airline.

The results are therefore based upon the technological and operative CO₂ efficiencies of airlines and renders them directly comparable. The efficiency points (EP) of the AAI express, how close an airline comes to the potential optimum result (best aircraft, best engine, maximum load factors etc.). 100 efficiency points mark this optimum, which an airline can realize today, using existing technology and employing best operations.

The atmosfair Airline Index method

1. Calculation of the CO₂ per net load kilometer for each flight-based on i.a. aircraft type, engine, seat and cargo capacity- and load factor.
2. Comparison of the CO₂ per net load kilometer with the best-case flight (according to the ICAO calculation method).
3. Determination of the city pair efficiency points of an airline (best case: 100 points; others relative to that).
4. Compilation of the city pair points of each airline to generate its mean global efficiency points.
5. Ranking of the airlines by global efficiency points

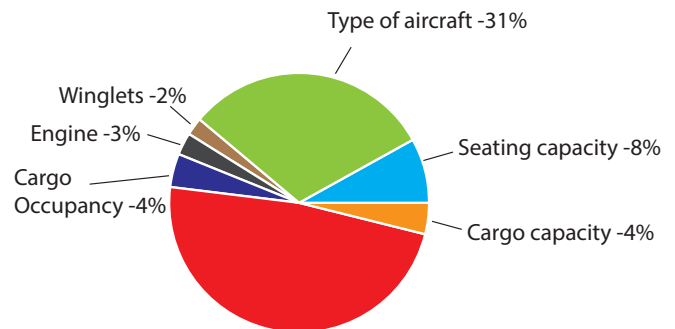
The AAI is based on the CO₂ calculation method of the ICAO. Accuracy: +1.5 efficiency points.

Detailed documentation of the CO₂ calculation method on www.atmosfair.de/airlineindex

Highlights atmosfair Airline Index 2018

- 33.0 million flights
- More than 200 airlines worldwide
- 22.600 City Pairs worldwide
- 92% of global air traffic
- average efficiency gain over AAI 2017 (all airlines): 1,9% less
- CO₂ per passenger and kilometre

Efficiency optimization: What has the greatest effect?



In order to increase CO₂ efficiency, airlines can optimize various factors. The graphic shows which factors have the greatest effect on reducing CO₂ emissions changing the factor by one standard deviation.

- 125 aircraft types (covering 97% of the market)
- 422 engines (covering 96% of the market)
- Respected independent data sources: ICAO, IATA, OAG, FlightGlobal etc.
- 2016 data

About atmosfair



Klaus Töpfer,
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atmosfair is a nonprofit organization for combating climate change, founded in 2004 from a research project of the German federal Ministry for the environment. We reduce CO₂ emissions of the source, e.g. via incentive programs for video conferences instead of business trips and companies. We compensate the remaining CO₂ emissions for our clients in CDM Gold standard projects with direct utility for local people and for the climate. Our reference customers include DHL and Greenpeace.

Since 2005 atmosfair performed best in international

