

think • go climate conscious



atmosfair Airline Index 2017



How is the Airline Index used?

1. Avoidance

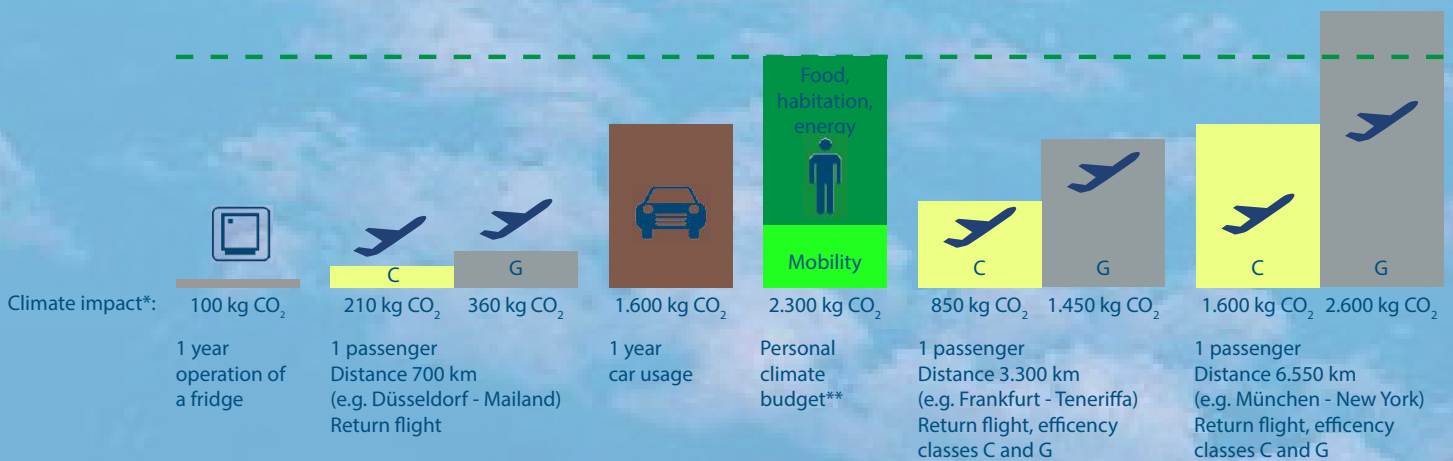
- Even efficient flights can quickly exceed a single person's annual climate CO₂ budget (see graphic). Are there alternatives available like the train?
- Have I chosen the direct flight? (Rule of thumb: a direct flight in Efficiency Class E is better for the climate than a transfer flight in Class C).

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



* 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 and airlines."

Prof. Dr. Stefan Gössling, Lund University:

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

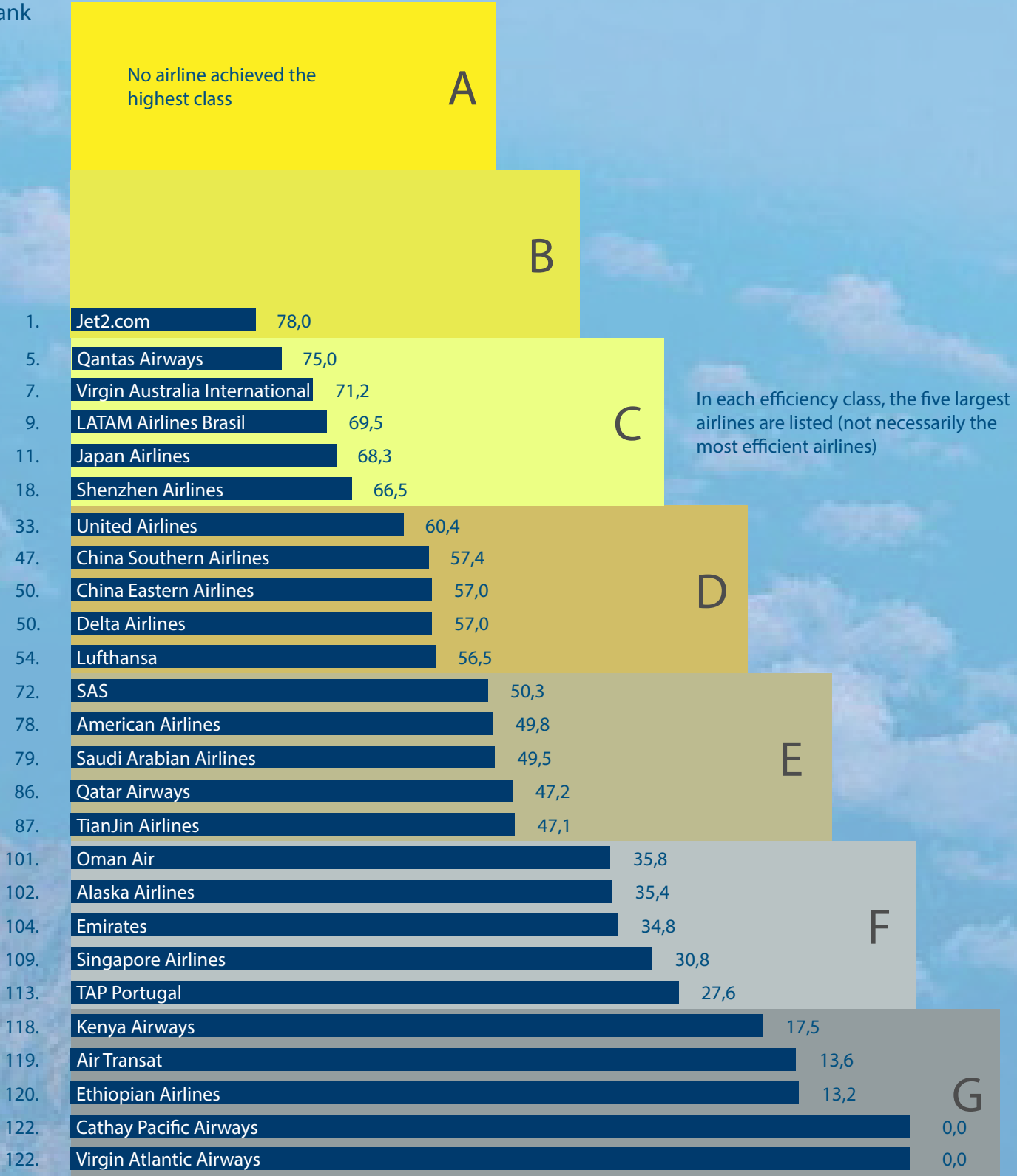
For corporates

The atmosfair airline ranking is available in detail even for single selected flight 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.

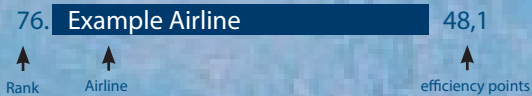
Ask us; we are happy to help you: airlineindex@atmosfair.de

AAI 2017 Evaluation of short haul flights (up to 800 km)

Rank



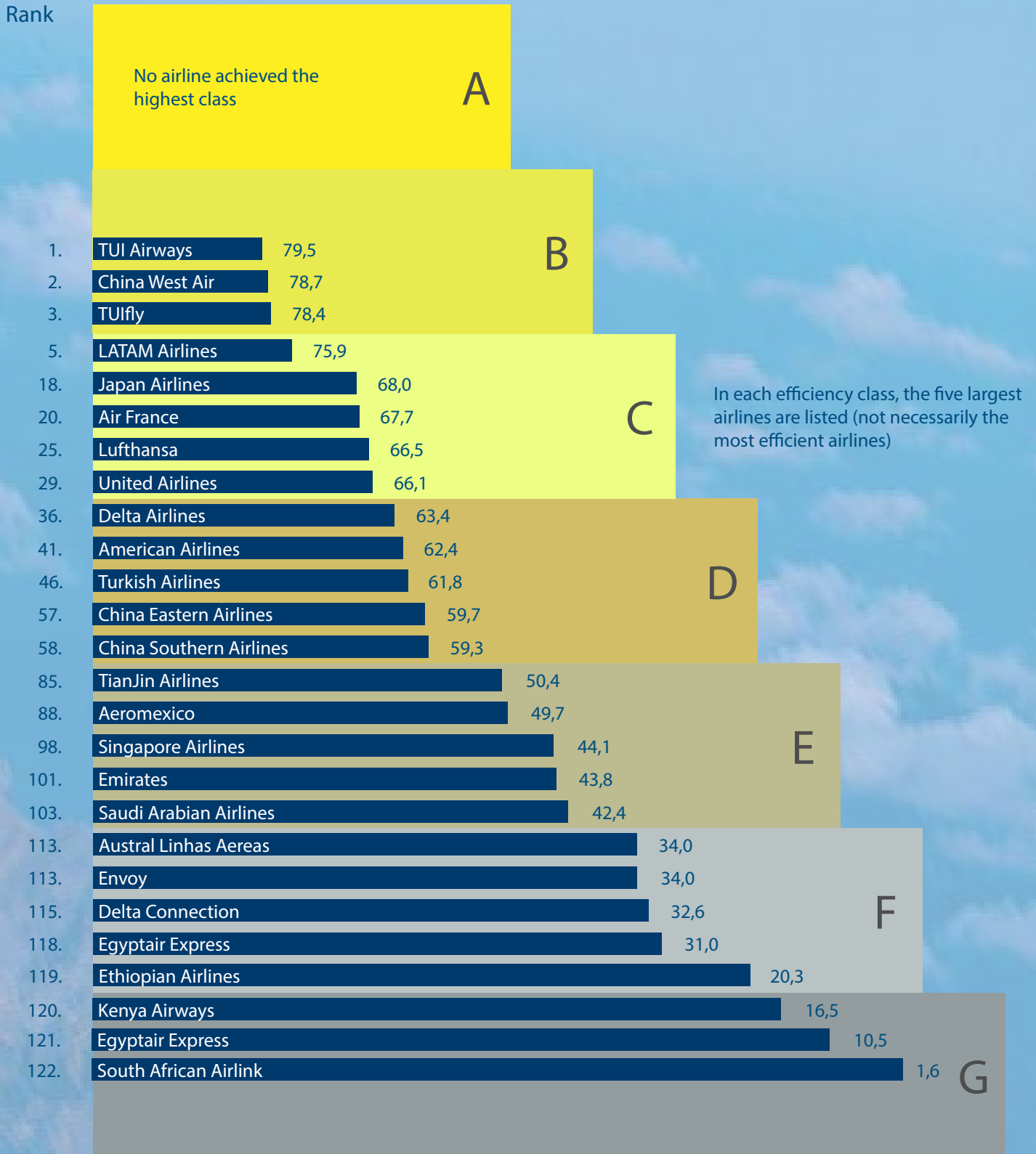
Legend



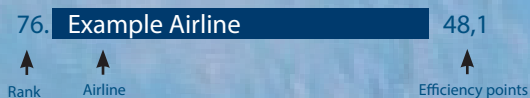
2015 data

Accuracy of all airlines ± 1,5 efficiency points

AAI 2017 Evaluation of medium haul flights (from 800km up to 3.800 km)



Legend

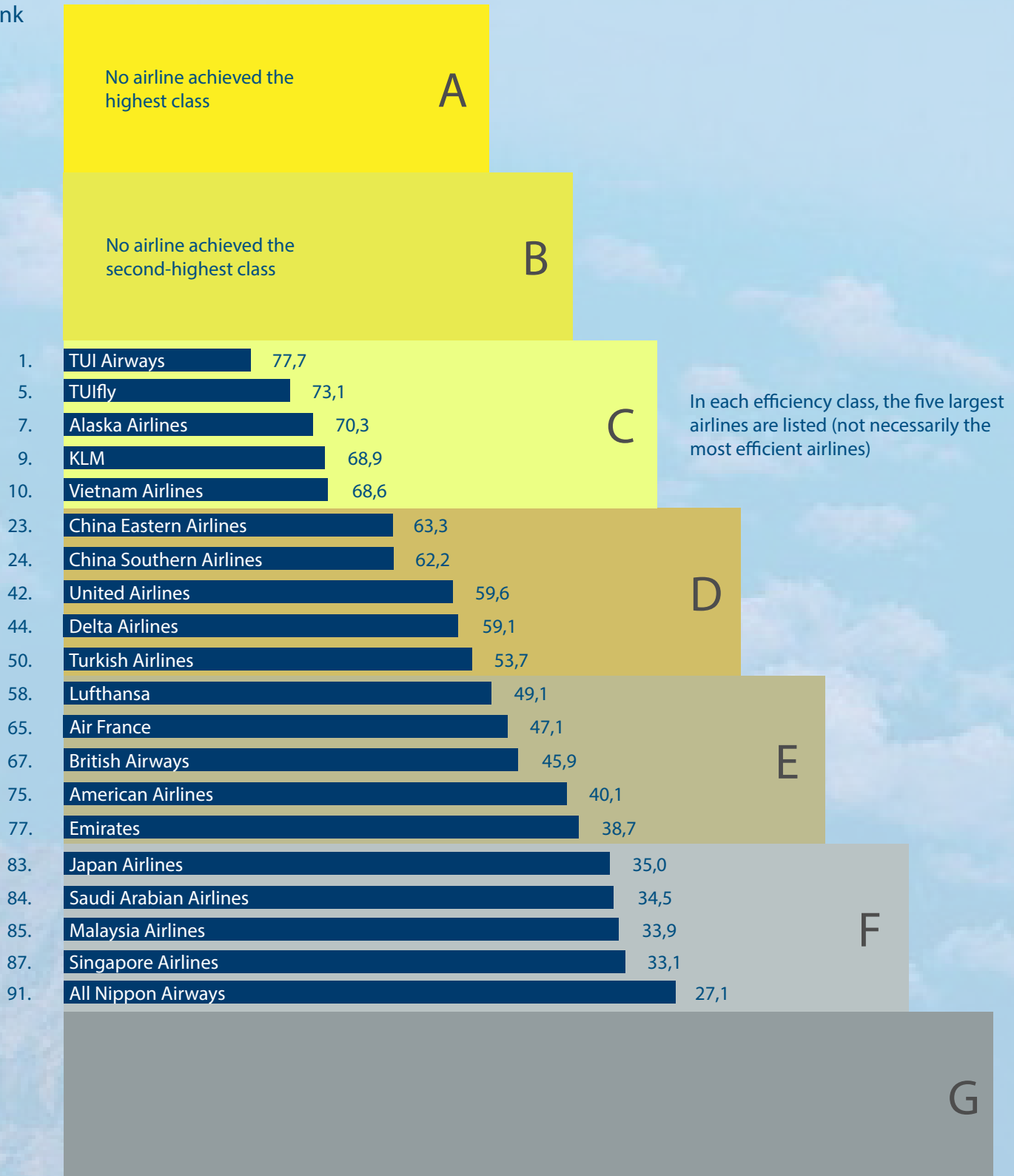


2015 data

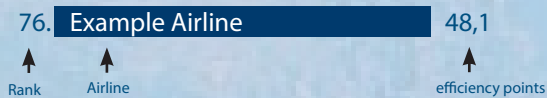
Accuracy of all airlines $\pm 1,5$ efficiency points

AAI 2017 Evaluation of long-haul flights (more than 3.800 km)

Rank



Legend



2015 data

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

Ranking in detail (1)

Overall ranking

Rank	Airline	Country	EP* '17	EP* '16	EK*	Type*	Pax (in Mio.)*
1	TUI Airways	UK	78,9	81,6	B	Charter	10,6
2	China West Air	China	78,6	83,1	B	Regional	5,8
3	TUIfly	Deutschland	78,2	82,7	B	Charter	8,0
4	TunisAir Express	Tunesien	75,3	71,8	C	Regional	0,5
5	XL Airways France	Frankreich	74,4	78,8	C	Charter	0,7
6	Monarch Airlines ¹	UK	73,9	77,5	C	Charter	5,7
7	Jet2.com	UK	73,8	75,1	C	Charter	5,9
8	Transavia.com	Niederlande	73,7	--	C	Charter	6,9
9	Condor	Deutschland	72,9	78,7	C	Charter	7,6
9	Thomas Cook Airlines	UK	72,9	79,4	C	Charter	6,4
11	LATAM Airlines Brasil ²	Brasilien	72,3	78,5	C	Net Carrier	37,1
12	Air Berlin ³	Deutschland	69,3	75,0	C	Net Carrier	30,2
13	KLM	Niederlande	68,1	72,2	C	Net Carrier	28,6
14	Alaska Airlines	USA	67,6	70,4	C	Net Carrier	22,9
15	Thomas Cook Scandinavia	Dänemark	67,2	--	C	Charter	2,4
16	Aegean Airlines	Griechenland	67,0	72,5	C	Regional	11,6
16	Virgin Australia International	Australien	67,0	71,8	C	Net Carrier	19,9
18	Air Transat	Kanada	65,7	75,7	C	Charter	3,8
18	Shenzhen Airlines	China	65,7	71,8	C	Net Carrier	25,5
20	Air Europa	Spanien	65,6	70,0	C	Net Carrier	10,2
20	S7 Airlines	Russland	65,6	68,0	C	Net Carrier	8,2
20	Sichuan Airlines	China	65,6	71,4	C	Net Carrier	21,2
23	Thai Airways International	Thailand	65,3	66,0	C	Net Carrier	18,4
24	Air New Zealand Link	Neuseeland	64,4	72,0	D	Regional	3,0
24	China United Airlines	China	64,4	61,6	D	Net Carrier	6,2
26	Vietnam Airlines	Vietnam	64,3	69,4	D	Net Carrier	17,1
27	Cathay Pacific Airways	Hong Kong	63,2	67,7	D	Net Carrier	24,0
28	Edelweiss Air	Schweiz	62,4	70,1	D	Charter	1,2
29	EVA Airways	Taiwan	62,1	66,1	D	Net Carrier	10,1
30	Avianca	Kolumbien	61,7	71,1	D	Net Carrier	28,3
30	Hong Kong Airlines	Hong Kong	61,7	61,6	D	Net Carrier	5,6
32	Juneyao Airlines	China	61,6	69,3	D	Net Carrier	10,6
33	TAP Portugal	Portugal	61,5	67,0	D	Net Carrier	11,4
34	Air New Zealand	Neuseeland	60,8	65,1	D	Net Carrier	14,3
35	Corsair	Frankreich	60,7	66,4	D	Charter	1,3
36	Air Mauritius	Mauritius	60,6	63,6	D	Net Carrier	1,5
36	Hainan Airlines	China	60,6	67,0	D	Net Carrier	38,7
38	Icelandair	Island	60,4	65,7	D	Net Carrier	3,1
39	QantasLink	Australien	59,9	63,4	D	Regional	5,8
40	Iberia	Spanien	59,8	62,2	D	Net Carrier	16,5
41	Delta Air Lines	USA	59,7	65,5	D	Net Carrier	179,4
41	United Airlines	USA	59,7	65,1	D	Net Carrier	140,4
41	Uzbekistan Airways	Usbekistan	59,7	65,5	D	Net Carrier	2,6
44	China Eastern Airlines	China	59,5	62,0	D	Net Carrier	93,8
45	Turkish Airlines	Türkei	59,4	66,8	D	Net Carrier	61,2
46	China Southern Airlines	China	59,3	63,1	D	Net Carrier	84,0
47	Garuda Indonesia	Indonesien	58,8	60,5	D	Net Carrier	23,6
48	Qantas Airways	Australien	58,2	64,8	D	Net Carrier	27,3
49	Beijing Capital Airlines	China	58,1	67,0	D	Net Carrier	10,7
50	Aerolineas Argentinas	Argentinien	58,0	61,3	D	Net Carrier	7,8
50	Air China	China	58,0	64,7	D	Net Carrier	58,8
52	Alitalia	Italien	57,8	65,4	D	Net Carrier	22,5
53	China Airlines	Taiwan	57,5	58,8	D	Net Carrier	14,7
54	Air India	Indien	57,4	59,8	D	Net Carrier	18,5
54	Finnair	Finnland	57,4	65,1	D	Net Carrier	10,3
56	Hawaiian Airlines	USA	57,0	63,8	D	Net Carrier	10,7
56	Royal Air Maroc Express	Marokko	57,0	65,5	D	Regional	0,5
58	MA'Swings	Malaysia	56,8	72,6	D	Regional	1,4
59	SilkAir	Singapur	56,3	60,0	D	Regional	3,8
60	Srilankan Airlines	Sri Lanka	56,0	67,3	D	Net Carrier	4,3

Distance-based ranking

<800 km			800-3800 km			>3800 km		
EP*	EK*	Rank	EP*	EK*	Rank	EP*	EK*	Rank
59,8	D	37	79,5	B	1	77,7	C	1
77,6	C	2	78,7	B	2			
75,6	C	3	78,4	B	3	73,1	C	5
75,5	C	4	61,9	D	45			
67,8	C	15	74,9	C	7	74,3	C	2
			74,1	C	8	72,9	C	6
78,0	B	1	73,8	C	10	73,3	C	4
70,2	C	8	73,8	C	10	74,0	C	3
48,9	E	81	77,1	C	4	67,5	C	11
			73,9	C	9	70,0	C	8
69,5	C	9	75,9	C	5	64,7	D	14
63,0	D	27	75,0	C	6	60,6	D	27
62,1	D	31	67,5	C	21	68,9	C	9
35,4	F	102	66,9	C	23	70,3	C	7
53,7	D	59	68,2	C	17	64,4	D	15
61,5	D	32	67,9	C	19			
71,2	C	7	69,4	C	15	58	D	30
13,6	G	119	70,7	C	12	63,2	D	17
66,5	C	18	65,6	C	31			
67,5	C	16	69,4	C	15	62,2	D	21
63,4	D	24	65,9	C	30	64,8	D	13
62,4	D	30	66,6	C	24	50,8	E	53
68,2	C	12	69,7	C	13	62,5	D	18
64,8	D	20	56,2	D	70			
63,8	D	22	64,5	D	33			
60,3	D	34	63,4	D	36	68,6	C	10
0,0	G	122	65,6	C	31	62,3	D	20
			67,1	C	22	56,3	D	38
62,8	D	28	69,5	C	14	57,1	D	36
58,8	D	41	62,8	D	38	62,5	D	18
72,6	C	6	61,3	D	51	56,9	D	37
59,8	D	37	61,7	D	47			
27,6	F	113	64,2	D	35	59,0	D	29
68,0	C	13	66,2	C	28	56,0	D	39
34,7	F	105	58,6	D	59	60,7	D	24
65,0	C	19	56,9	D	63	60,7	D	24
63,6	D	23	61,7	D	47	54,0	D	41
39,8	E	97	61,4	D	50	59,5	D	28
58,9	D	40	61,1	D	52			
63,4	D	24	64,4	D	34	48,1	E	60
57,0	D	50	63,4	D	36	53,7	D	42
60,4	D	33	66,1	C	29	53	D	44
52,2	D	66	62,0	D	42	50	E	54
57,0	D	50	59,7	D	57	60,8	D	23
67,9	C	14	61,8	D	46	51,4	D	50
57,4	D	47	59,3	D	58	60,7	D	24
64,6	D	21	62,6	D	40	45,8	E	68
75,0	C	5	66,3	C	27	47,7	E	61
57,1	D	49	58,2	D	61			
50,3	E	72	62,7	D	39	51,3	D	51
57,7	D	45	56,8	D	64	61,2	D	22
60,0	D	36	60,6	D	54	49,2	E	57
57,5	D	46	62,0	D	42	51,2	D	52
57,3	D	48	60,5	D	55	53,0	D	44
52,5	D	63	66,4	C	26	49,3	E	56
51,9	D	68				58,0	D	30
59,5	D	39	50,1	E	87			
56,8	D	53						
53,4	D	60	56,6	D	65	57,8	D	34
55,1	D	56	54,2	D	79	57,9	D	33

*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: Air India Express, Dragonair, Go Air, IndiGo Air, Jetairfly, Jetstar Asia, Lion Air, Pegasus Airlines, SunExpress, Tigerair Singapore, Gol Linhas Aéreas

¹ Monarch Airlines still listed as the airline's insolvency took place during the publication of the AAI

² also TAM Linhas Aereas

³ Air Berlin still listed as the airline's insolvency took place during the publication of the AAI

Ranking in detail (2)

Overall Ranking

Rank	Airline	Country	EP* '16	EP* '15	EK*	Type*	Pax (in Mio.)*
61	Ukraine International	Ukraine	55,9	53	D	Net Carrier	4,8
62	Shandong Airlines	China	55,8	67,2	D	Net Carrier	15,9
63	Aeroflot Russian Airlines	Russland	55,7	65	D	Net Carrier	26,1
64	Air Canada	Kanada	55,5	66,1	D	Net Carrier	28,4
65	Lufthansa	Deutschland	55,2	62,6	D	Net Carrier	79,3
66	American Airlines	USA	55,1	57,9	D	Net Carrier	201,2
66	Ural Airlines	Russland	55,1	59,1	D	Net Carrier	5,4
68	Air France	Frankreich	55,0	66,3	D	Net Carrier	49,5
69	Copa Airlines	Panama	54,8	60,1	D	Net Carrier	7,9
69	El Al Israel Airlines	Israel	54,8	64,7	D	Net Carrier	4,9
71	Tunisair	Tunisien	54,1	63,1	D	Net Carrier	2,8
72	Xiamen Airlines Company	China	53,8	58,6	D	Net Carrier	22,8
73	Asiana Airlines	Südkorea	53,1	58,8	D	Net Carrier	17,7
73	Japan Airlines	Japan	53,1	59,1	D	Net Carrier	32,4
75	Pakistan International	Pakistan	52,5	57,5	D	Net Carrier	4,4
76	SAS Scandinavian Airlines	Schweden	52,0	58,6	D	Net Carrier	28,1
77	British Airways	UK	51,7	55,3	D	Net Carrier	43,3
78	Austrian Airlines	Österreich	51,6	61,2	D	Net Carrier	10,8
79	Iberia Regional	Spanien	51,3	54,6	D	Regional	2,2
80	Aeromexico	Mexico	50,2	64	E	Net Carrier	10,6
81	Philippine Airlines	Philippinen	50,1	59,5	E	Net Carrier	12
82	Etihad Airways	VAE	49,8	66,5	E	Net Carrier	17,6
83	ANA wings	Japan	49,6	55,7	E	Regional	5,0
84	PAL Express	Philippinen	49,5	--	E	Regional	4,8
85	Korean Air	Südkorea	49,3	57,1	E	Net Carrier	25
86	Brussels Airlines	Belgien	49,0	53,4	E	Net Carrier	7,5
87	Alaska Horizon	USA	48,9	61,3	E	Regional	5,0
87	TianJin Airlines	China	48,9	61,2	E	Regional	11,1
89	All Nippon Airways	Japan	48,1	56,7	E	Net Carrier	50,8
90	Lufthansa Regional	Deutschland	46,8	--	E	Regional	5,0
90	Swiss Global Air Lines	Schweiz	46,8	35,8	E	Regional	1,5
90	Swiss	Schweiz	46,8	53	E	Net Carrier	16,3
93	UTair Aviation	Russland	46,5	58,6	E	Net Carrier	5,5
94	Qatar Airways	Katar	46,1	64,9	E	Net Carrier	26,7
95	Air Canada Express	Kanada	45,6	58,3	E	Regional	6,0
96	Malaysia Airlines	Malaysia	45,5	58,1	E	Net Carrier	15
97	Royal Air Maroc	Marokko	45,3	54,8	E	Net Carrier	6,1
98	Nordic Regional Airlines	Finnland	44,3	50,4	E	Regional	3,0
99	Gulf Air	Bahrain	44,2	56,8	E	Net Carrier	5,3
99	LOT - Polish Airlines	Polen	44,2	53,5	E	Net Carrier	4,6
101	Kuwait Airways	Kuwait	42,2	40,2	E	Net Carrier	2,5
102	South African Express	Südafrika	41,6	51,3	E	Regional	0,2
103	South African Airways	Südafrika	41,4	49,2	E	Net Carrier	6,7
104	J-Air	Japan	41,3	46,2	E	Regional	1,8
105	Egyptair	Ägypten	41,1	48	E	Net Carrier	8,8
106	Virgin Atlantic Airways	UK	40,9	45	E	Net Carrier	5,9
107	Oman Air	Oman	40,5	51,2	E	Net Carrier	6,4
108	Virgin Australia Regional	Australien	40,4	--	E	Regional	2,0
109	Saudi Arabian Airlines	Saudi Arabien	40,3	42,9	E	Net Carrier	27,3
110	BA CityFlyer	UK	39,7	48,8	E	Regional	1,8
111	Emirates	VAE	39,6	70,1	E	Net Carrier	51,9
112	Mahan Air	Iran	39,0	52,5	E	Net Carrier	5,3
113	Ohana by Hawaiian	USA	38,8	53,3	E	Regional	0,3
114	TAP Express	Portugal	37,0	42,3	E	Regional	1,2
115	Air Astana	Kasachstan	36,0	47,2	E	Net Carrier	3,9
116	Singapore Airlines	Singapur	35,1	57,7	F	Net Carrier	19
117	Royal Jordanian	Jordanien	34,7	42,2	F	Net Carrier	3,0
118	Austral Lineas Aereas	Argentinien	33,2	40,4	F	Regional	3,0
119	Envoy	USA	32,8	38,5	F	Regional	12,3
120	United Express	USA	32,0	41,1	F	Regional	22,0
121	Aeromexico Connect	Mexico	30,6	53,9	F	Regional	8,0
122	Delta Connection	USA	29,5	37,4	F	Regional	39,0
123	Ethiopian Airlines	Äthiopien	26,5	36	F	Net Carrier	7,0
124	Egyptair Express	Ägypten	22,0	31,1	F	Regional	0,5
125	Kenya Airways	Kenia	19,5	34,1	G	Net Carrier	4,2

Distance-based ranking

<800 km			800-3800 km			>3800 km		
EP*	EK*	Rank	EP*	EK*	Rank	EP*	EK*	Rank
42,1	E	92	55,7	D	71	65,1	C	12
56,5	D	54	55,6	D	72			
58,0	D	44	56,4	D	67	52,7	D	46
51,9	D	68	57,5	D	62	53,3	D	43
56,5	D	54	66,5	C	25	49,1	E	58
49,8	E	78	62,4	D	41	40,1	E	75
52,9	D	62	56,4	D	67	47,4	E	62
66,6	C	17	67,7	C	20	47,1	E	65
44,6	E	90	53,5	D	81	57,8	D	34
69,5	C	9	56,6	D	65	51,5	D	49
51,8	D	70	54,4	D	77	46,3	E	66
53,3	D	61	53,8	D	80	58,0	D	30
60,1	D	35	55,4	D	74	48,2	E	59
68,3	C	11	68,0	C	18	35,0	F	83
41,2	E	94	54,7	D	76	52,1	D	48
50,3	E	72	58,5	D	60	38,6	E	78
54,3	D	57	62,0	D	42	45,9	E	67
45,1	E	89	51,7	D	83	55,4	D	40
52,4	D	65	48,1	E	91			
46,6	E	88	49,7	E	88	52,4	D	47
56,9	D	52	55,5	D	73	42,1	E	73
58,1	D	42	56,3	D	69	47,2	E	63
50,0	E	74	45,2	E	96			
50,0	E	74	43,9	E	99			
63,4	D	24	59,9	D	56	42,3	E	72
47,8	E	83	49,1	E	90	49,6	E	55
47,4	E	85	51,2	D	84			
47,1	E	87	50,4	E	85			
62,7	D	29	61,7	D	47	27,1	F	91
43,7	E	91	50,4	E	85			
47,5	E	84	46,4	E	92			
54,1	D	58	61,0	D	53	39,1	E	76
50,6	E	71	46,0	E	94	47,2	E	63
47,2	E	86	54,3	D	78	43,4	E	70
49,5	E	79	42,1	E	104			
52,5	D	63	55,1	D	75	33,9	F	85
34,7	F	105	45,6	E	95	45,0	E	69
58,1	D	42	36,7	E	112			
35,4	F	102	49,5	E	89	36,9	E	80
40,1	E	96	37,7	E	109	63,5	D	16
48,6	E	82	46,4	E	92	35,7	F	81
50,0	E	74	37,6	E	110			
52,1	D	67	52,2	D	82	32,6	F	89
41,6	E	93	40,2	E	106			
40,8	E	95	43,3	E	102	33,7	F	86
0,0	G	122				40,9	E	74
35,8	F	101	44,7	E	97	35,4	F	82
50,0	E	74	38,2	E	108			
49,5	E	79	42,4	E	103	34,5	F	84
36,3	E	100	43,9	E	99			
34,8	F	104	43,8	E	101	38,7	E	77
37,8	E	99	41,8	E	105	37,0	E	79
38,8	E	98						
23,2	F	116	38,6	E	107			
29,4	F	110	37,5	E	111	32,6	F	89
30,8	F	109	44,1	E	98	33,1	F	87
22,8	F	117	32,6	F	115	42,6	E	71
27,7	F	112	34,0	F	113			
30,9	F	108	34,0	F	113			
32,2	F	107	31,9	F	117			
28,4	F	111	32,2	F	116			
25,9	F	114	31,0	F	118			
13,2	G	120	20,3	F	119	33,1	F	87
25,1	F	115	10,5	G	121			
17,5	G	118	16,5	G	120	24,3	F	92

*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	Country	Efficiency Class	Efficiency Points 2017	Efficiency Points 2016	Efficiency Points 2015	Type	Pax (in Mio.)
1	TUI Airways	UK	B	78,9	81,7	82,2	Charter	10,6
2	TUIfly	Deutschland	B	78,2	82,8	83,6	Charter	8,0
3	XL Airways France	Frankreich	C	74,4	78,8	74,1	Charter	0,7
4	Monarch Airlines ¹	UK	C	73,9	77,5	80,3	Charter	5,7
5	Jet2.com	UK	C	73,8	75,1	--	Charter	5,9
6	Transavia.com	Niederlande	C	73,7	--	--	Charter	6,9
7	Thomas Cook Airlines	UK	C	72,9	79,4	68,2	Charter	6,4
7	Condor Flugdienst	Deutschland	C	72,9	78,7	72,4	Charter	7,6
9	Thomas Cook Scandinavia	Dänemark	C	67,2	--	--	Charter	2,4
10	Air Transat	Kanada	C	65,7	75,7	76,4	Charter	3,8
11	Edelweiss Air	Schweiz	D	62,4	70,1	--	Charter	1,2
12	Corsair	Frankreich	D	60,7	66,4	64,4	Charter	1,3

Ranking Regional Carrier

Rank	Airline	Country	Efficiency Class	Efficiency Points 2017	Efficiency Points 2016	Efficiency Points 2015	Type	Pax (in Mio.)
1	China West Air	China	B	78,6	83,1	-	Regional	5,8
2	TunisAir Express	Tunisia	C	75,3	71,8	92,5	Regional	0,5
3	Aegean Airlines	Greece	C	67,0	72,5	74,7	Regional	11,6
4	Air New Zealand Link	New Zealand	D	64,4	72,0	76,2	Regional	3,0
5	QantasLink	Australia	D	59,9	63,4	63,5	Regional	5,8
6	Royal Air Maroc Express	Morocco	D	57,0	65,5	-	Regional	0,5
7	MASwings	Malaysia	D	56,8	72,6	86,6	Regional	1,4
8	SilkAir	Singapore	D	56,3	60,0	-	Regional	3,8
9	Iberia Regional	Spain	D	51,3	54,6	58,1	Regional	2,2
10	ANA Wings	Japan	E	49,6	55,7	-	Regional	5,0
11	PAL Express	Phillipinen	E	49,5	-	-	Regional	4,8
12	TianJin Airlines	China	E	48,9	61,2	-	Regional	11,1
12	Alaska Horizon	USA	E	48,9	61,3	64,8	Regional	5,0
14	Swiss Global Air Lines	Swiss	E	46,8	-	-	Regional	1,5
14	Lufthansa Regional	Germany	E	46,8	49,3	44,2	Regional	5,0
16	Air Canada Express	Canada	E	45,6	58,3	53,0	Regional	6,0
17	Nordic Regional Airlines	Finland	E	44,3	50,4	45,5	Regional	3,0
18	South African Express	South Africa	E	41,6	51,3	56,0	Regional	0,2
19	J-Air	Japan	E	41,3	46,2	47,3	Regional	1,8
20	Virgin Australia Regional	Australia	E	40,4	-	-	Regional	2,0
21	BA CityFlyer	United Kingdom	E	39,7	48,8	41,7	Regional	1,8
22	Ohana by Hawaiian	USA	E	38,8	53,3	-	Regional	0,3
23	TAP Express	Portugal	E	37,0	42,3	40,9	Regional	1,2
24	Austral Lineas Aereas	Argentina	F	33,2	40,4	-	Regional	3,0
25	Envoy	USA	F	32,8	38,5	41,2	Regional	12,3
26	United Express	USA	F	32,0	41,1	31,1	Regional	22,0
27	Aeromexico Connect	Mexico	F	30,6	53,9	47,1	Regional	8,0
28	Delta Connection	USA	F	29,5	37,4	34,0	Regional	39,0
29	Egyptair Express	Egypt	F	22,0	-	-	Regional	0,5
30	South African Airlink	South Africa	G	2,6	-	-	Regional	0,3

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 incomparable to other airlines. However, the direct CO₂ emissions of the LCCs can be calculated. In order to not withhold this information from flight passengers, LCCs are 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. Thus these subsidies 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 Carrier¹

Efficiency Class	Type	Airlines
A	Low Cost Carrier	---
B	Low Cost Carrier	Scout
C	Low Cost Carrier	Aer Lingus, Air Arabia, AirAsia, Airasia X, Cebu Pacific Air, Citilink Indonesia, Easyjet Flydubai, Frontier Airlines, Indonesia AirAsia, Jetstar Airways, Norwegian Air Shuttle, Ryanair, Southwest Airlines, SpiceJet, Spirit Airlines, Spring Airlines, Thai AirAsia, VietJet Air, Volaris, Vueling Airlines, Wizz Air
D	Low Cost Carrier	Allegiant Air LLC, Azul Airlines, Flynas - National Air Services, 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	Best charter airline worldwide. Flies consistently with efficient aircraft (e.g., B737-800). The aircraft almost maximizes seating in combination with a very high occupancy and thus achieves the top position .
China West Air	Chinese regional airline, flies only with efficient aircraft (including A320). Achieved the top ranking due to very dense seating and very high occupancy.
TUIfly	Flies consistently with efficient aircraft (e.g. B737-800). The aircraft almost maximizes seating and thus thus earns many points due to very high occupancy.
Condor	Flies with tight seating and efficient aircraft (e.g., A320, B757). Condor, particularly on medium-distance routes, gained points compared to the previous year due to its high occupancy.
LATAM Brasil	Fleet with efficient aircraft (e.g., A320, A330, B777), slightly more seating than average. In combination with a high occupancy level, LATAM scores high once again.
KLM	Fleet with mostly efficient machines (e.g. B737-800, B777, B/87). Medium haul fleet slightly above average long-haul fleet slightly below average in terms of seating. KLM gains points due to an occupancy slightly above average, especially on the long-haul flights.
Alaska Airlines	Best American Net Carrier. Dense seating in all aircraft. Fleet consists mainly of efficient machines (z.B. B737-800 / -900) but also some inefficient machines (B737-400). In combination with a high occupancy level Alaska Airlines still earned a top rank.
Shenzhen Airlines	Fleet with efficient machines (z.B. B737-800). The seating is above average. The airline loses points due to moderate occupancy.
Delta Airlines	The fleet consists partly of efficient aircraft (u. A320, B737-700, B737-800), partly of inefficient aircraft (u. a. MD-80) and has predominantly less seating than average. Due to that fact Delta loses points despite its high occupancy level (even very high on medium-haul flights).
United	Fleet consist mostly of efficient aircraft (e.g. A320, B737-800, B777) and partly (to a small degree) of inefficient aircraft. United earns point due to high occupancy on middle-haul flights but does not exploit the potential because seating is only average. On long-haul flights United loses points due to below average seating and average occupancy.
Lufthansa	Lufthansa does not exploit the maximum potential due to the seating which is below average. The short- and middle-haul fleet consists partly of inefficient machines (including B737-300/500). Significant increase of efficiency compared with the previous year as a result of better occupancy and technological improvement of the fleet. Increased use of modern WideBody Jets (A330, A380, B747-8I) on long-haul flights.
American Airlines	Fleet consists mostly of efficient aircraft (e.g. A320, B737-800, B777) and partly of inefficient aircraft (e.g. MD-80), especially on middle-haul flights. Middle-haul fleet seating is average, long-haul fleet seating is slightly below average. American Airlines still earns points due to high occupancy on middle-haul flights but drops points because of average occupancy on long-term flights .
Emirates	Fleet cwith modern Jets (e.g. B777, A330, A380). The Widebody Jets have an below average seating und are thus less efficient than NarrowBodyJets with under average seating. Due to significantly less occupancy (in comparison with the previous year) Emirates loses many points.

¹ The selection made here does not represent any value.

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 rise again, since the fuel used at the end of the flight is carried around the entire flight.

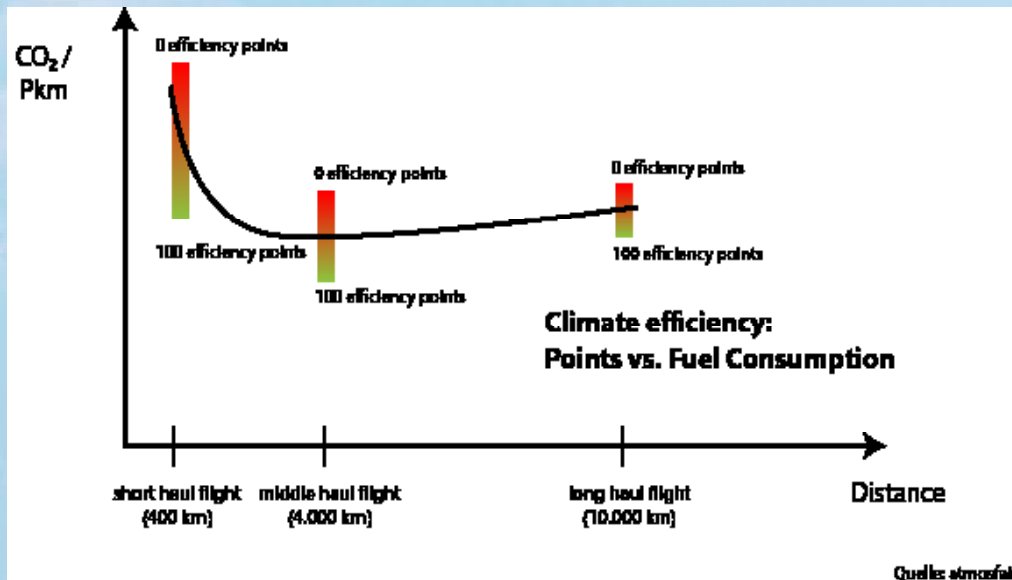


Figure 1 shows average CO₂ emissions per passenger and kilometer as a function of the flight distance (full curve). For typical short, medium and long haul-distances, three bars show the range of CO₂ efficiencies of planes from the real airlines covered in the AAI. The lower end of the bar marks the 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 illustrates that absolute indicators such as g CO₂ per passenger kilometer 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

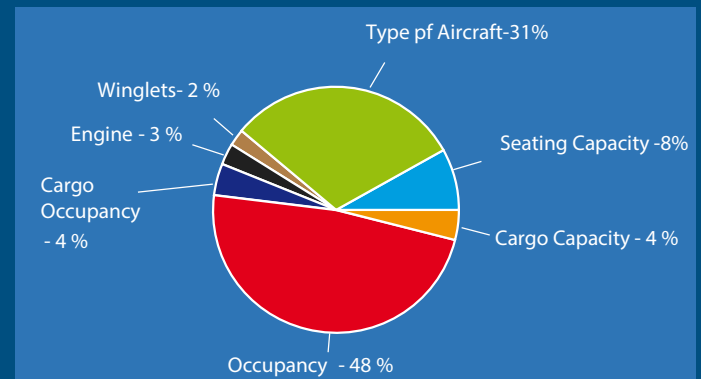
The AAI is based on the CO₂ calculation method of the ICAO. Accuracy: +1.5 efficiency points

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

Highlights atmosfair Airline Index 2017

- 31,5 million flights
- More than 200 airlines worldwide
- 22.200 City Pairs worldwide
- 92% of global air traffic
- average efficiency gain over AAI 2015 (all airlines): 1,9% less CO₂ per passenger and kilometre
- 119 aircraft types (covering 97% of the market)
- 398 engines (covering 96% of the market)
- Respected independent data sources: ICAO, IATA, OAG, FlightGlobal etc.
- 2015 data

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.

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 comparative studies:



(Selection)