

CIVIL AVIATION AND THE ENVIRONMENT

NOISE

Aviation generates noise emissions too. However, the number of people exposed, in relation to other transport carriers, is rather low.

Exceeding the emission limit value pursuant to LSV:

Transport Carrier	Exposed population over IGW ¹⁾	
	Day	Night
Road	1,200,000	700,000
Railroad	70,000	140,000
Aviation	35,000	40,000

The noise-burdened area ²⁾ surrounding Zurich airport has decreased over the past 20 years by two thirds, in spite of 50% more air traffic movements. At the same time, the population in the affected areas increased by 83%.

ENERGY / CO₂

Around 2% of worldwide fossil energy consumption is assignable to civil air transport. This results in a share of 2% of man-made CO₂ output. Air transport contributes with approximately 13% of worldwide CO₂ emissions of the transport sector. A modern airliner, such as the Airbus A 380, consumes during an intercontinental flight 3 litres fuel each 100 kilometres and available seat.

CLIMATE

According to the report «Aviation and the Global Atmosphere» of UNEP and WMO (IPCC 1999) ³⁾ the worldwide air traffic contributes with 3.5% ⁴⁾ to the man-made greenhouse effect. With increasing air traffic that share could grow to 5% in 2050, as per IPCC. The state of scientific research about the impact of nitric oxides and water vapour arising from aircraft engines on the greenhouse effect still shows significant uncertainties. The latest scientific studies assume that the substances amplify the greenhouse effect of CO₂ by factor 1.2. CO₂ emissions at cruise altitude have the same effect as ground-level emissions (e.g. road traffic, industry or heating). Approximately one third of the nitrogen oxide at cruising level originates from shipped ground-level emissions, from aircraft or has natural origins (thunderstorms).

¹⁾ emission limit value

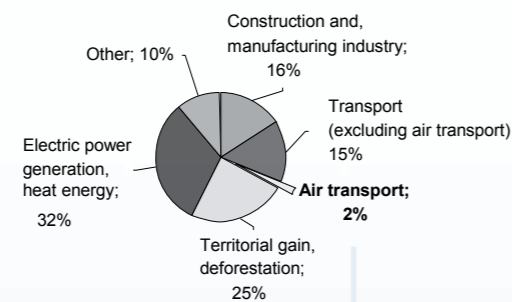
²⁾ 60 Leq day-time noise

³⁾ IPCC is the scientific body of UNEP (United Nations Environmental Program) and WMO (World Meteorological Organisation).

⁴⁾ Besides the impact of CO₂, further effects such as nitric oxides and condensation trails are included herein.

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Breakdown of CO₂ emissions by sector



Source : World Research Institute WRI

The global aviation industry is engaged to further mitigate greenhouse gas emissions.

This engagement is based on four pillars:

- **1st pillar: improved technology** (e.g. lower-emission engines, lighter aircraft equipment, alternative fuels from renewable resources)
- **2nd pillar: operational measures** (e.g. shorter and more direct air routes, fuel-saving start and landing procedures)
- **3rd pillar: more efficient infrastructure** (e.g. better use of airspace and airports)
- **4th pillar: economic measures** (e.g. voluntary CO₂- offset, emission trading)

EMMISSION TRADING

In 2012, the EU introduced the Emission Trading System (ETS). This applies to all flights starting from or landing in an EU-country, including also non-EU airlines. ETS is a cap-and-trade system. The affected airlines receive 85% of CO₂ emissions based in 2005 free of charge. The difference including growth need to be purchased via certificates, which evidence that CO₂ could be saved through measures elsewhere. In principle the aviation industry is not against the introduction of an ETS. However, such initiative must be introduced globally. A regional ETS like the EU-ETS distorts competition and leads to detours via hubs outside of Europe, what eventually creates more emissions.

AEROSUISSE

LIST OF ITS 132 MEMBERS (as at 30th April 2012)

Aero-Club of Switzerland, Luzern
 Aero Insurance Service AG, Zürich-Flughafen
 Aerolite Max Bucher AG, Ennetbürgen
 Aéroport de Neuchâtel SA, Colombier
 Aéroport de Sion, Sion
 Aéroport Régional Les Eplatures SA, La Chaux-de-Fonds
 A + I aviation insurance, Glausen u. Partner AG, Thun
 Aircraft Service Grenchen, Grenchen
 Air-Espace Sàrl, Colombier
 Airline Assistance Switzerland AG, Zürich-Flughafen
 Airport Altenrhein AG, Altenrhein
 Airport Buochs AG, Stans
 Air Safety Security Services LLC, Vessy
 Air Service Basel AG, Basel-Flughafen
 ALPAR Flug- und Flugplatzges. AG, Belp
 Alp-Air Bern, Belp
 Alpine Air Support GmbH, Brütten
 Amac Aerospace Switzerland AG, Basel
 AOPA Switzerland, Zürich
 Avex Aviation Experts AG, Wallisellen
 Aviasuisse, Zürich
 Aviation Experts Group, Egglisau
 Aviation Media AG, Teufen
 AviSwiss GmbH, Zollikon
 Belair Airlines AG, Glattbrugg
 Breitling SA, Grenchen
 Bureau de Travaux et d'Etudes en Environnement BTEE SA, Genève
 Caminada & Partner AG, Zug
 Cargologic AG, Zürich-Flughafen
 Cat Aviation AG, Zürich-Flughafen
 CGS Corporate Group Service AG, Zürich-Flughafen
 Clin d'Ailes, Musée de l'Aviation Militaire, Payerne
 Darwin Airline SA, Lugano
 Dasnair SA, Genève-Aéroport
 Dnata Switzerland AG, Kloten

Dufry International AG, Basel
 Easyjet Switzerland SA, Cointrin
 Ecole de parachutisme de Château d'Oex, Le Vaud
 EFOS Flight Charter AG, Kloten
 Engadin Airport AG, Samedan
 EuroAirport Basel-Mulhouse-Freiburg, Basel-Flughafen
 European Business Aviation Association EBAA (Switzerland), Zollikon
 ExecuJet Europe AG, Zürich-Flughafen
 Farnair Switzerland AG, Allschwil
 Farnier Aviation Holding AG, Solothurn
 Farnier Air Services Swiss SA, Sion
 Fischer Road Cargo AG, Bassersdorf
 Fliegerschule Birrfeld AG, Birr-Lupfig
 Fliegerweb.com Hobby Verlag AG, Mägenwil
 FLUBAG Flugbetriebs AG, Neudorf
 Flughafen Zürich AG, Zürich-Flughafen
 Flugschule Basel, Basel-Flughafen
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 groWING of Switzerland GmbH, Hünenberg
 H. Bodmer & Co. AG, Zürich
 Hello AG, Basel
 Helvetic Airways AG, Zürich-Flughafen
 HLF Aviation, Kloten
 Holly Ballon AG, Bremgarten
 Horizon Swiss Flight Academy Ltd., Kloten
 Huber + Suhner AG, Pfäffikon
 IG AirCargo, Zürich-Flughafen
 IG Berner Luftverkehr, Bern

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IG Luftverkehr Vereinigung Pro EuroAirport, Basel
 ISS Aviation AG, Zürich-Flughafen
 Japat AG / Novartis International AG, Basel
 Jet Aviation Management AG, Zürich-Flughafen
 Ju-Air, Dübendorf
 Kessler Consulting Inc., Zürich
 Lantal Textiles, Langenthal
 Legendair Ltd., Reinach
 Lightwing Aircraft AG, Stans
 Lions Air AG, Zürich-Flughafen
 Lugano Airport, Agno
 Malbuwit AG Flight Training Center, Belp
 Marenco Swisshelicopter AG, Niederurnen
 Mathys Aviation Ltd., Bettlach
 Mecaplex AG, Grenchen
 MEGGITT SA, Freiburg
 Moreillon Dr. Pierre, Honorary President, Lausanne
 Motorfluggruppe Thurgau, Lommis
 Motorflug-Veteranen des AeCS, Châtel-sur-Montsalvens
 The Nuance Group AG, Glattbrugg
 Pilatus Flugzeugwerke AG, Stans
 Premium Jet AG, Zürich
 Piora Facility Management AG, Zürich-Flughafen
 PrivatAir SA, Cointrin
 Rabbit-Air, Bachenbülach
 Rega Schweiz. Rettungsflugwacht, Zürich-Flughafen
 Regionalflygplatz Jura-Grenchen AG, Grenchen
 Resource Consulting AG, Baar
 Revue Thommen AG, Waldenburg
 RUAG Schweiz AG, RUAG Aviation, Emmen
 SAIG Swiss Aeronautical Industries Group, Zürich

Schweiz. Gletscherpiloten-Vereinigung SGPV, Hergiswil
 SimAviatic AG, Pratteln
 Sirius AG, Zürich-Flughafen
 skyguide, Schweizerische AG für zivile und militärische Flugsicherung, Genève
 Sky Jet AG, Zürich-Flughafen
 Sky Work Airlines AG, Belp
 Slot Coordination Switzerland, Zürich-Flughafen
 Solenix GmbH, Kappel
 SPAS Seaplane Pilots Association Switzerland, Egglisau
 SR Technics Switzerland, Zürich-Flughafen
 SSIIG Swiss Space Industries Group, Zürich
 Super Constellation Flyers Association, Basel
 Swiss Aerodromes, Lausanne
 Swiss Aerospace Cluster, Greppen
 Swiss Aircraft Maintenance Association SAMA, Basel
 Swiss Association of Aeronautical Sciences, Emmen
 Swiss Hanggliding & Paragliding Association SHPA, Zürich
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 Zürich Versicherungs-Gesellschaft, Zürich

AEROSUISSE

The umbrella organisation AEROSUISSE, established in 1968, looks after the interests of Swiss civil aviation and space and ensures its long-term means of existence. It represents all on promotion and preservation of Swiss aerospace ideally and economically interested stakeholders and coordinates their aspirations. AEROSUISSE takes influence on design of the legal framework in connection with aerospace and maintains active contact to government, parliament and respective authorities as well as the media. AEROSUISSE today encompasses over 130 companies and organisations, including scheduled and charter airlines, national and regional airports, ground handlers, air traffic control, maintenance shops, manufacturer of aircraft and subcomponents, flight training schools, all influential aerospace associations as well in a broader sense other aerospace-related companies.

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SOURCES

- ARE Bundesamt für Raumentwicklung, Bern
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- BFS Bundesamt für Statistik, Neuchâtel
- BAFU Bundesamt für Umwelt, Bern
- Deutsche Forschungsanstalt für Luft- und Raumfahrt, Oberpfaffenhofen (D)
- Deutsche Lufthansa AG, Frankfurt (D)
- Flughafen Frankfurt Main AG, Frankfurt (D)
- IATA International Air Transport Association, Genève
- IDT Institut für öffentliche Dienstleistungen und Tourismus, St. Gallen
- INFRAS, Zürich
- Luftfahrtpolitischer Bericht des Bundesrates vom 10. Dezember 2004
- Pro Luftfahrt, Egelsbach (D)
- Rega Schweizerische Rettungsflugwacht, Zürich
- Schweizerischer Hängegleiter-Verband, Zürich
- Schweiz Tourismus, Zürich
- SIAA Swiss International Airports Association, Zürich
- skyguide, Schweizerische AG für zivile und militärische Flugsicherung, Genève
- Swiss International Air Lines AG, Basel

AEROSUISSE

VADEMECUM 2012

SWISS CIVIL AVIATION IS OF OUTSTANDING IMPORTANCE FOR THE NATIONAL ECONOMY ¹⁾



VALUE ADDED AND LABOUR FORCE OF CIVIL AVIATION 2008 ²⁾

Effects ³⁾	Value Added ⁴⁾ in billion CHF	GDP ⁴⁾ %	Occupation FTE ⁵⁾
Direct	7.0		35,600
Indirect	2.7		16,800
Economic significance in a narrower sense	9.7	1.8	52,400
Induced	11.6		71,200
Passenger-driven catalysis	9.0		55,300
Economic significance in a broader sense	20.6	3.8	126,500
Sum of all effects ⁶⁾	30.3	5.6	178,900

BREAKDOWN OF DIRECT EMPLOYMENT EFFECTS 2008 ²⁾

	Emplois
Zurich	20,100
Geneva	7,700
Basel	5,900
Bern	290
St. Gallen-Altenrhein	150
Lugano	260
Sion	150

Airports with airline movements ⁶⁾

Regional airports without airline traffic	340
Airfields and miscellaneous (flying schools etc.)	550
Heliports	110
Airports without airline movements ⁶⁾	1,000
Aviation industry (maintenance, fitting, sub-components)	12,900

Operation of a short- / medium-haul aircraft	40 - 120
Operation of a long-haul aircraft	130 - 160
Per million flight passengers ⁷⁾	750 - 2,000

¹⁾ Aviation Policy Report of Federal Council, 2004

²⁾ Economic significance of aviation in Switzerland, 1 June 2011, INFRAS

³⁾ The sum of direct and indirect effect corresponds to the (causally narrow) economic significance of aviation in Switzerland (incl. exports of aviation industry). The induced and passenger-driven catalytic effect illustrates, which further, causally less narrow, economic linkages aviation exhibits with the rest of the economy.

⁴⁾ Incl. exports of aviation industry

⁵⁾ Full Time Equivalents

⁶⁾ Including aviation industry

⁷⁾ Direct and indirect effects

CIVIL AVIATION IN THE PUBLIC INTEREST



The state government specifically highlights in its Aviation Policy Report of the Federal Council dated 10 December 2004 the outstanding economic importance of aviation and air transport connections from Switzerland to key destinations in Europe and overseas. The airline traffic is explicitly recognised as part of the public transport. On a value basis, one third of all exports is processed by air freight. Each third foreign tourist approaches Switzerland by air.

THE CONFEDERATION,S CIVIL AVIATION EXPENDITURES in comparison (CHFm)

	2010	2011
Total expenditures federal government	59,266	62,333
whereof transport	8,225	8,062
whereof aviation ¹⁾	96	132

The confederation,s expenditures in favour of civil aviation are with 0.16% in 2010 and with 0.21% in 2011 in relation to the overall expenditures extremely modest.

Neither the infrastructure nor operations of aircraft is subsidised.

AIR TRAFFIC CONTROL

Skyguide, the Swiss incorporated limited company for civil and military air traffic control, coordinates and directs the air traffic of Switzerland and parts of neighbouring airspace. Skyguide is an enterprising and customer oriented private limited company owned by the federal government. Its running costs are covered by route and landing charges.

	2009	2010	2011
Revenue in CHFm	363	365	427
Employees (Full Time Equivalents)	1,309	1,316	1,330

Airports where Skyguide is in charge: Alpnach, Bern, Buochs, Dubendorf, Emmen, Genf, Grenchen, Locarno, Lugano, Meiringen, Payerne, Sion, St. Gallen-Altenrhein und Zurich. On the regional airport Les Éplatures the local air navigation service is delegated to the airport operator. Per capita basis, Switzerland is one of the countries with the most condensed air navigation demand in the world.

¹⁾ Expenditures for international organisations of civil aviation, certain security tasks, supervision (FOCA), education, Eurocontrol, aircraft procurement

FIGURES ON SWISS CIVIL AVIATION



	2009	2010	2011
FLIGHT PASSENGERS (on SIAA airports) ¹⁾			
Zurich	21,926,872	22,878,251	24,337,954
Geneva	11,324,141	11,880,397	13,130,222
Basel	3,854,770	4,129,186	5,053,649
Lugano	167,125	169,084	175,348
Bern	107,628	101,286	184,655
St. Gallen-Altenrhein	86,913	81,835	108,000
Total	37,467,449	39,240,039	42,989,828

FLIGHT MOVEMENTS (on national and regional airports)

Zurich	262,121	268,765	279,001
Geneva	172,671	177,400	189,121
Basel	74,992	77,154	87,584
Birrfeld	78,411	72,340	76,254
Grenchen	77,267	74,491	76,211
Bern	58,309	56,136	62,130
Sion	45,280	42,444	44,036
Lausanne-Blécherette	38,868	35,391	38,878
St. Gallen-Altenrhein	29,205	29,756	28,753
Écuwillens	24,057	21,972	18,177
Lugano	25,076	21,310	24,392
Samedan	20,446	18,662	18,732
Les Éplatures	12,527	10,951	15,407
Bressaucourt			5,225
Total	919,230	906,772	963,901

Transit flights within the Swiss airspace	707,823	706,165	712,830
Destination / countries ²⁾	157 / 54	184 / 54	175 / 53
Rescue flights by helicopter (Rega)	10,443	10,213	10,797
Ambulance flights by jet (Rega)	741	702	698
Freight and post (t)	319,450	379,389	394,423

¹⁾ SIAA Swiss International Airports Association

²⁾ operated by Swiss domiciled airlines

FIGURES ON SWISS CIVIL AVIATION



	2009	2010	2011
AIRPORTS			
National airports	3	3	3
Regional airports	10	10	11
Airfields	46	46	45
Heliports	23	23	23
COMPANIES			
Airline operators	9	9	8
Commercial operators (non-airline)	90	81	77
Maintenance and repair shops	90	90	90
Flight schools	143	142	137
Hang-gliding schools with SHV label	56	60	62
other hang-gliding schools	52	54	59
Parachute schools	13	13	15
Manufacturers	12	13	13

DEVELOPMENT OF THE AIRCRAFT PORTFOLIO

Airplanes (fixed wing)	1,869	1,913	1,932
Helicopter (rotor wing)	320	327	334
Engined-powered gliders	246	251	254
Gliders	843	824	800
Hang-gliders	14,160	14,318	14,765
Balloons	397	381	379
Airships	10	9	10

SWISS TRAFFIC NETWORK

	2011
Line network of Swiss-domiciled airlines	464'869 km
Roadways (in Switzerland)	71,452 km
Railways (in Switzerland)	5,425 km

EXPOSED TERRAIN

	Area	Area per capita
Land area of Switzerland	41,285 km ²	5,252 m ²
Airports ¹⁾	30 km ²	3.81 m ²
Sealed land area in respect of:		
Roadways	741 km ²	94.27 m ²
Railways	114 km ²	14.50 m ²
Airports ¹⁾	8 km ²	1.02 m ²

¹⁾ National and regional airports

FIGURES ON SWISS CIVIL AVIATION



TRAINING CENTRES IN SWITZERLAND

Airfields across the entire country offer various opportunities getting trained in aviation activities and practice aviation sports. This task is provided by 137 flight training schools, 121 hang-glider flight schools and more than 400 clubs.

Many dynamic companies offering qualified employment and access to several vocational training are located at domestic airfields.

LICENCES

	2009	2010	2011
Private Pilot	5,586	5,581	5,565
Commercial Pilot	940	952	947
Airline Transport Pilot	2,203	2,266	2,201
Multi-Crew Pilot License (MPL/A)	17	46	63
Helicopter Pilot	1,135	1,168	1,208
Glider Pilot	2,453	2,617	2,324
Balloonist	360	340	346
Hang-Glider	32,494	33,309	34,245
Parachutist	1,492	1,472	1,550
Recognition of foreign permits	11	8	26
On-Board Engineer	2	2	1
On-Board Radio Operator	12	10	7
Aircraft Maintenance Mechanic	2,843	2,977	2,992

SWISS SPACE INDUSTRY



Switzerland shaped European space activities since its beginning.

Swiss Technology was already on-board of the first European satellite ESRO-1.

Switzerland is a founding member of ESA (European Space Agency) and participates in many programmes of the European space organisation. In 2009, Switzerland contributed CHF 150m to ESA,s budget, representing the eight largest contributor.

The main focus of Swiss space industry is based on the development and manufacture of subsystems for the use in space. The product portfolio is broad and extends from payload claddings and structures up to optical, mechanical and electronic components as well as scientific instruments and ground equipment.

Thanks to the comprehensive competencies and technologies, which have been acquired during ESA programmes, Swiss companies are meanwhile also successful in commercial space projects such as launch vehicle programme «Ariane».

In total, Swiss space companies achieve an annual turnover of around CHF 200m.

The majority of the 800 individuals employed have above-average qualifications.

Half of the employed space-related workforce has a university degree.

Most space companies in Switzerland are represented in the Swiss Space Industries Group (SSIG) of Swissmem.