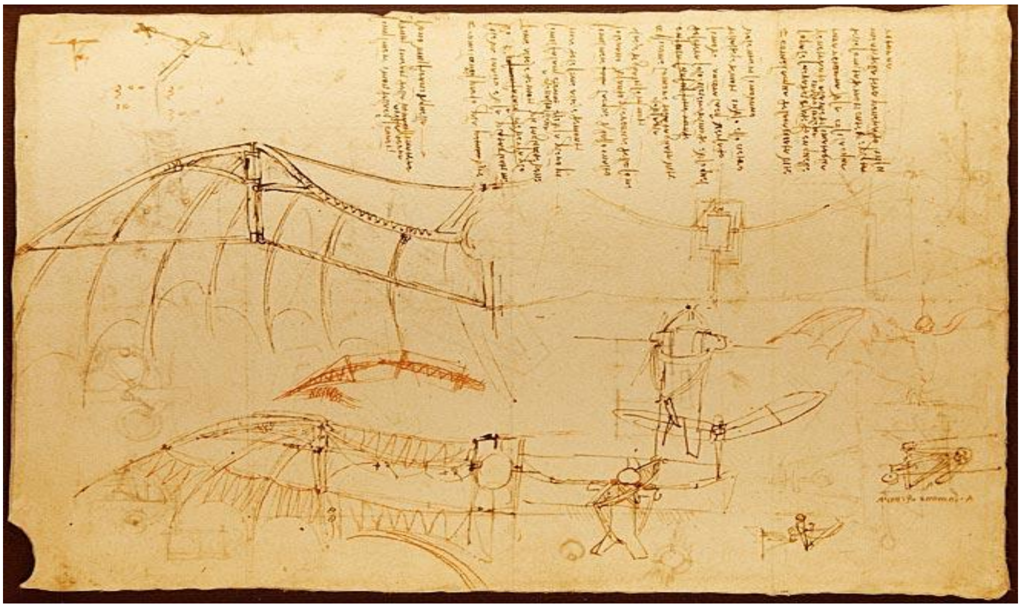
ITALY'S ACTION PLAN

ON CO_2 EMISSIONS REDUCTION



Leonardo, Flying machine – wing device. Atlantic Code

June, 2012

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INDEX

1. INTRODUCTION

Italy is a member of the European Union and of the European Civil Aviation Conference (ECAC). ECAC is an intergovernmental organisation covering the widest grouping of Member States of any European organisation dealing with civil aviation. It is currently composed of 44 Member States, and was created in 1955.
ECAC States share the view that environmental concerns represent a potential constraint on the future development of the international aviation sector, and together they fully support ICAO's ongoing efforts to address the full range of these concerns, including the key strategic challenge posed by climate change, for the sustainable development of international air transport.
Italy, like all of ECAC's forty-four States, is fully committed to and involved in the fight against climate change, and works towards a resource-efficient, competitive and sustainable multimodal transport system.
Italy recognises in this connection the value of each State preparing and submitting to ICAO a State Action Plan on emissions reductions, as an important step towards the achievement of the global collective goals agreed at the 37th Session of the ICAO Assembly in 2010.

In that context, all ECAC States will be submitting to ICAO an Action Plan, regardless of whether or not the 1% de minimis threshold is met, thus going beyond the agreement of ICAO Assembly Resolution A/37-19.

This is the Action Plan of Italy.

Italy shares the view of all ECAC States that a comprehensive approach to reducing aviation emissions is necessary, and that this should include:

i. emission reductions at source, including European support to CAEP work and more efficient operations
ii. research and development on emission reductions technologies, including public-private partnerships
iii. the development and deployment of low-carbon sustainable alternative fuels, including research and operational initiatives undertaken jointly with stakeholders

iv. the optimisation and improvement of Air Traffic Management, and infrastructure use within Europe, in particular through the Single European Sky ATM Research (SESAR), and also beyond European borders, through the Atlantic Initiative for the Reduction of Emissions (AIRE) in cooperation with the US FAA.

v. Market-based measures, such as open emission trading schemes (ETS), which allow the sector to continue to grow in a sustainable and efficient manner, recognising that the measures at (i) to (iv) above cannot even in aggregate deliver in time the emissions reductions necessary to meet the global goal. This growth becomes possible through the purchase under and ETS of CO_2 allowances from other sectors of the economy, where abatement costs are lower than within the aviation sector.

In Europe, many of the actions which are undertaken within the framework of this comprehensive approach are in practice taken at a supra-national level. They are reported in Section 3 of this Action Plan, where Italy involvement in them is described, as well as that of stakeholders.

In Italy a number of actions are undertaken at the national level, including by stakeholders, in addition to those of a supra-national nature. These national actions are reported in Section 4 of this Plan.

In relation to actions which are taken at a supranational level, it is important to note that:

- The extent of participation will vary from one State and another, reflecting the priorities and circumstances of each State (economic situation, size of its aviation market, historical and institutional context, such as EU/ non EU). The ECAC States are thus involved to different degrees and on different timelines in the delivery of these common actions. When an additional State joins a collective action, including at a later stage, this broadens the effect of the measure, thus increasing the European contribution to meeting the global goals.
- Nonetheless, acting together, the ECAC States have undertaken to reduce the region's emissions through a comprehensive approach which uses each of the

pillars of that approach. Some of the component measures, although implemented by some but not all of ECAC's 44 States, nonetheless yield emission reduction benefits across the whole of the region (thus for example research, ETS).

2. CURRENT STATE OF AVIATION

ENAC - the Italian Civil Aviation Authority - was established on 25th July 1997 by Legislative Decree no. 250/97 as the National Authority committed to oversee the technical regulation, the surveillance and the control in the civil aviation field.

Enac is engaged in dealing with the diverse regulatory aspects of air transport system and performs monitoring functions related to the enforcement of the adopted rules regulating administrative and economical issues.

The air transport issues part of Enac institutional mandate are various and varied. Its core business is doubtless represented by safety control, in its double meaning of safety and security, according to internationally agreed terms of reference. Safety is understood as the safe planning, construction, maintenance and exploitation of aircraft, as well as the skill assessment of air carriers and in-flight personnel. Security is meant as the land-side safeguard of passengers, on board aircraft, inside and outside the airports, aimed at the prevention of illicit acts

According to its institutional mandate, Enac performs, in addition to the issues referred to above:

- preliminary inquiries leading to the entrustment to joint-stock companies of concessions for the total management of airports;
- the entry into force of the Legislative Decree regarding the free access to the market of handling services in national airports;
- regulating procedures of airport services;
- examination and assessment of land use projects and intervention programmes, as well as investments and airport development;
- preliminary evaluation of acts regarding tariffs and airport charges;
- evaluation of the conditions for warranting the application of state funded fares on certain city pairs;
- certification of personnel operating in the aeronautical/air navigation field;
- enforcement of recommendations issued by the National Flight Safety Agency.

Enac headquarters are in Rome and representative offices are located in the major Italian airports.

Enac is strongly engaged at national and international level in pushing forward decision making processes for a policy of environmental and territory protection. This is carried out with an holistic approach and through attentive assessments aiming at limiting the environment impact on airport areas and reducing aircraft acoustic and atmospheric pollution.

2.1. Airlines

a) Airlines with an Italian AOC (2012, April):

Air Dolomiti

- **Air Italy**
- **Air One**
- **Air Vallée**
- **Alitalia Cityliner**
- **Alitalia Compagnia Aerea Italiana**
- **Belle Air Europe**
- **Blue Panorama**
- **C.A.I. First**
- **C.A.I. Second**
- **Meridiana Fly**
- **Mistral Air**
- **Neos**
- **Skybridge Airops**
- **Small Planet Airlines S.r.l.**
- **Wind Jet**

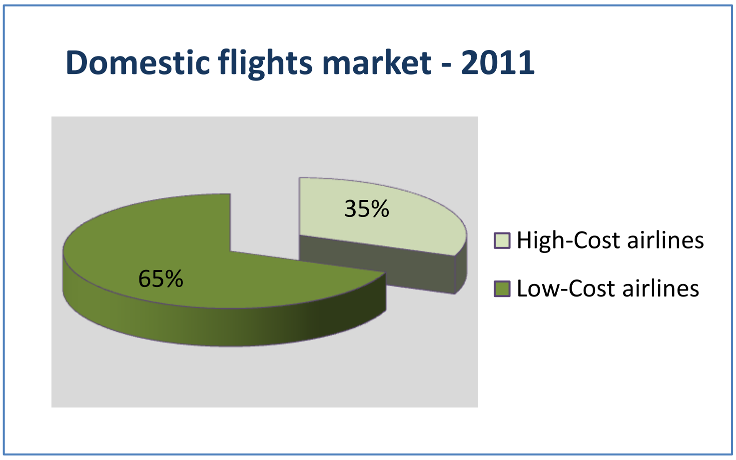
b) 2011 - Airlines operating in Italy

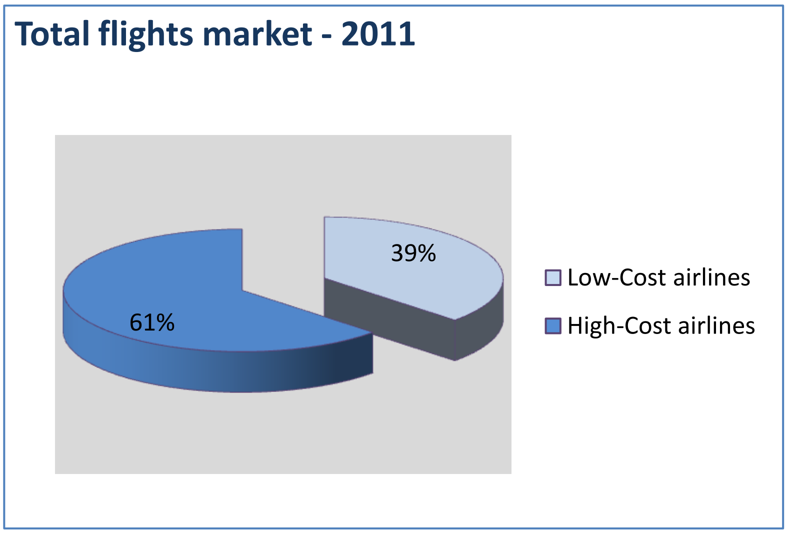
This table provides shows the ranking of the 50 largest airlines operating in Italy

	Airline	Nationality	Pax
1	Alitalia-Gruppo Cai	Italy	25.896.582
2	Ryanair	Ireland	22.114.392
3	Easyjet	United Kingdom	10.526.297
4	Deutsche Lufthansa	Germany	6.447.057
5	Meridiana	Italy	4.223.926
6	Air France	France	3.249.101
7	Wind Jet	Italy	2.655.022
8	British Airways	United Kingdom	2.566.644
9	Wizz Air	Hungary	2.309.481
10	Air Berlin	Germany	2.299.783
11	Blu Panorama Airlines	Italy	1.907.532
12	Vuelng Airlines	Spain	1.824.110
13	Iberia	Spain	1.424.191
14	Klm Royal Dutch Airlines	Netherlands	1.317.895
15	Emirates	United Arab Emirates	960.969
16	Neos	Italy	950.564
17	Swiss Air International	Switzerland	933.830
18	Air Italy	Italy	904.830
19	Tap-Air Portugal.	Portugal	825.545
20	Delta Air Lines Inc	USA	786.557
21	Turkish Airlines	Turkey	759.772
22	Brussels Airlines	Belgium	733.982
23	Belle Air	Albania	723.630
24	Austrian Airlines	Austria	717.132
25	German Wings	Germany	713.847
26	Scandinavian Airlines - Sas	Sweden	609.888
27	Blue Air	Romania	575.392
28	Aeroflot	Russia	499.753
29	Aer Lingus	Ireland	464.294
30	Mistral Air	Italy	454.193
31	Norvegian Air Shuttle	Norway	450.497
33	Aegean Aviation	Greece	448.069
33	Easyjet Switzerland	Switzerland	437.663
34	Thomson Fly	United Kingdom	391.874
35	Basiq Air - Transavia	Netherlands	373.537
36	Royal Air Maroc	Morocco	370.241
37	Qatar Airways	Qatar	360.693
38	Jet 2 Ch. Express Air Services	United Kingdom	352.979
39	Us Airways	USA	348.316
40	Air Malta	Malta	344.446
41	Czech airlines - Csa	Czech Republic	342.084
42	Finnair	Finland	328.712
43	Flyniki	Austria	320.272
44	Cathay Pacific Airways	Hong Komg	312.730
45	Air Europa	Spain	307.025
46	American Airlines	USA	282.714
47	Air China International	China	280.045
48	Tunis Air	Tunisia	275.582
49	Air Nostrum	Spain	275.311
50	Carpatair	Romania	269.330

i) High-cost and low-cost airlines

In Italy the low-cost airlines gained large market shares: they operate 39 per cent of total flights and 43 per cent of the international flights.





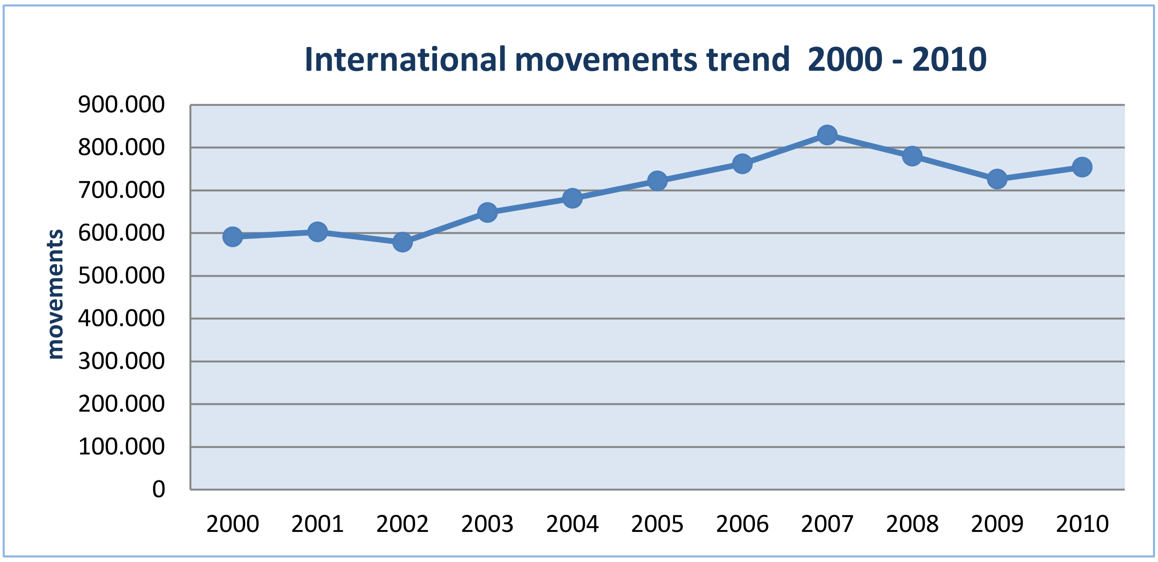
ii) Commercial air carriers - traffic

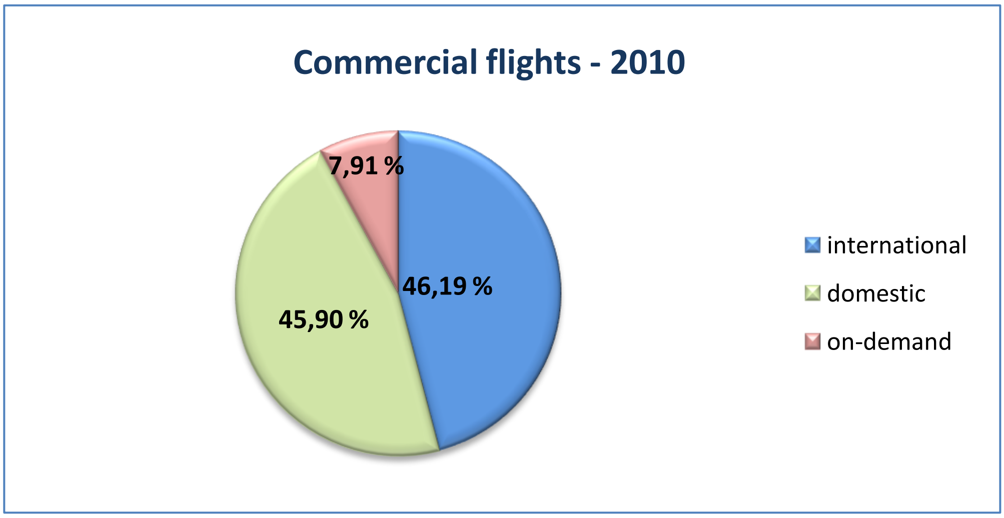
In Italy between 2002 and 2011 total aircraft movements increased considerably, with a growth of 21 per cent, from 1.190.316 to 1.450.342. International movements increased more than 36 per cent, from 578.607 tons to 787.585.

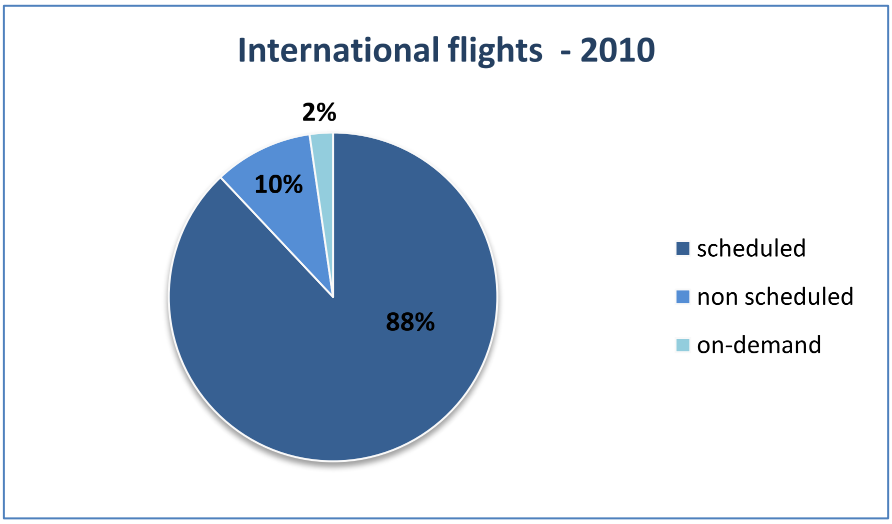
Tables provide data on flight movements and number of passengers embarked and disembarked in Italian airports.

Aircraft movements (2002-2011)

Year	Domestic	%	International	%	Total Commercial	%
2002	611.618	1,6	578.697	-4,0	1.190.316	-1,2
2003	630.030	3,0	648.004	12,0	1.278.034	7,4
2004	602.187	-4,4	681.249	5,1	1.283.436	0,4
2005	595.925	-1,1	721.965	5,9	1.317.890	2,6
2006	624.321	4,8	761.902	5,5	1.386.223	5,2
2007	666.608	6,8	829.257	8,8	1.501.859	8,3
2008	654.006	-1,9	779.777	-6,0	1.433.783	-4,5
2009	630.404	-3,6	726.204	-6,9	1.356.608	-5,4
2010	624.737	-0,9	754.148	3,8	1.378.885	1,6
2011	662.807	6,1	787.535	4,4	1.450.342	5,2


International movements trend 2000 - 2010
movements
900.000
800.000
700.000
600.000
500.000
400.000
300.000
200.000
100.000
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010


Commercial flights - 2010
7,91 %
46,19 %
45,90 %
international
domestic
on-demand

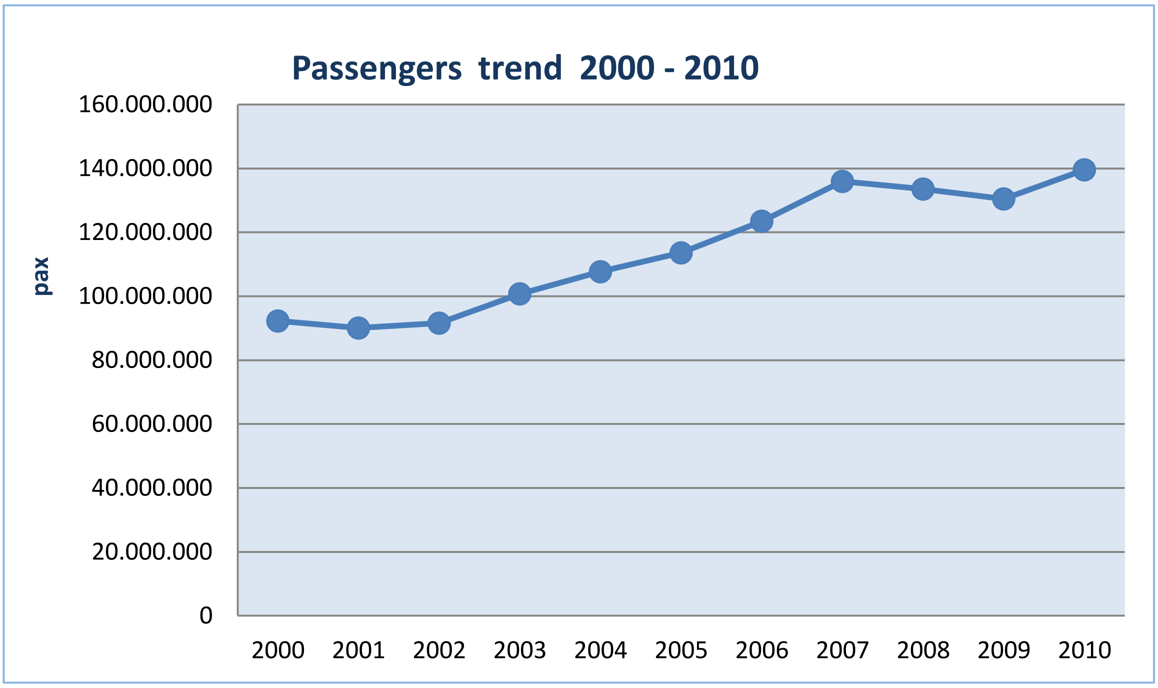

International flights - 2010
2%
10%
88%
scheduled
non scheduled
on-demand

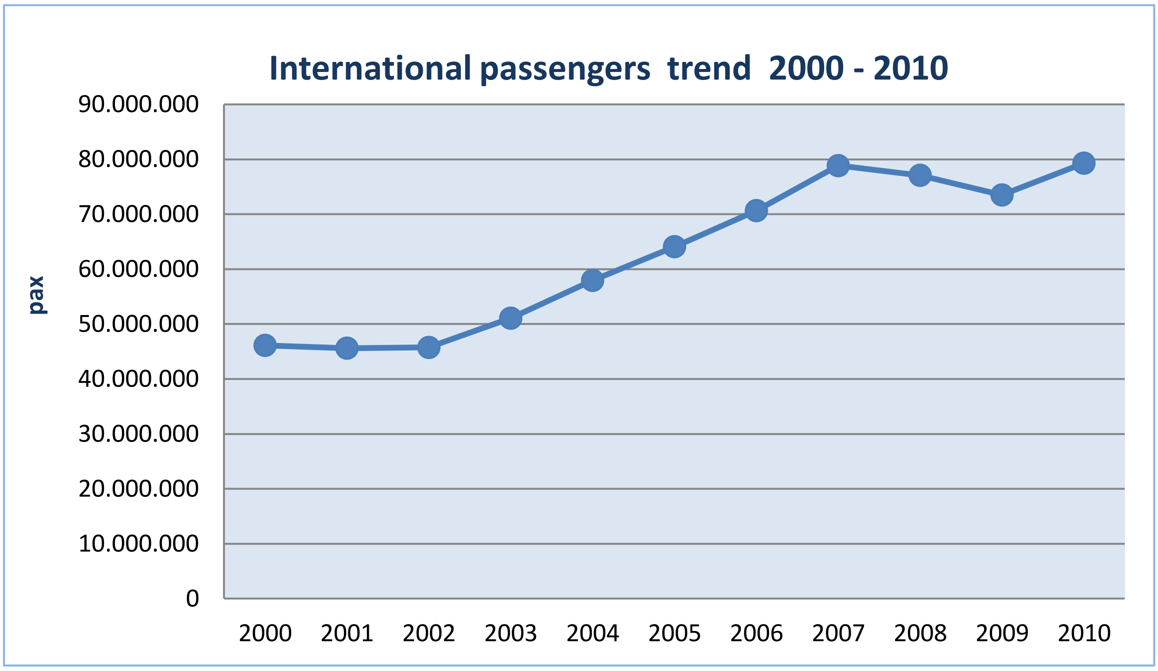
In Italy between 2002 and 2011 the number of passengers carried on commercial services grew more than 60 per cent, from 91.575.841 to 147.946.210. Passengers on international flights increased more than 84 per cent, from 45.742.459 to 84.181.393.

In 2011 Italian airports handled more than 873.844 tons of cargo and mail, of which 89 per cent was international.

Passengers (2000-2010)

Year	Domestic	%	International	%	Tot. Commercial	%
2002	44.976.222	3,6	45.742.459	0.3	91.575.841	1.7
2003	48.680.691	8,2	51.068.160	11,6	100.747.413	10,0
2004	48.612.947	-0,1	57.950.770	13,5	107.667.064	6,9
2005	48.440.901	-0,4	64.095.668	10,6	113.576.684	5,5
2006	51.741.346	6,8	70.657.262	10,2	123.473.472	8,7
2007	55.961.572	8,2	78.847.623	11,6	135.925.038	10,1
2008	55.347.732	-1,1	77.089.380	-2,2	133.544.096	-1,8
2009	55.940.298	1,1	73.501.762	-4,7	130.459.621	-2,3
2010	59.228.056	5,9	79.297.183	7,9	139.558.285	7,0
2011					1.47.946.210	


Passengers trend 2000 - 2010
pax
160.000.000
140.000.000
120.000.000
100.000.000
80.000.000
60.000.000
40.000.000
20.000.000
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010


International passengers trend 2000 - 2010
pax
90.000.000
80.000.000
70.000.000
60.000.000
50.000.000
40.000.000
30.000.000
20.000.000
10.000.000
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010

2.2. Airports

Italy has 96 airports. 41 are open to international air services.

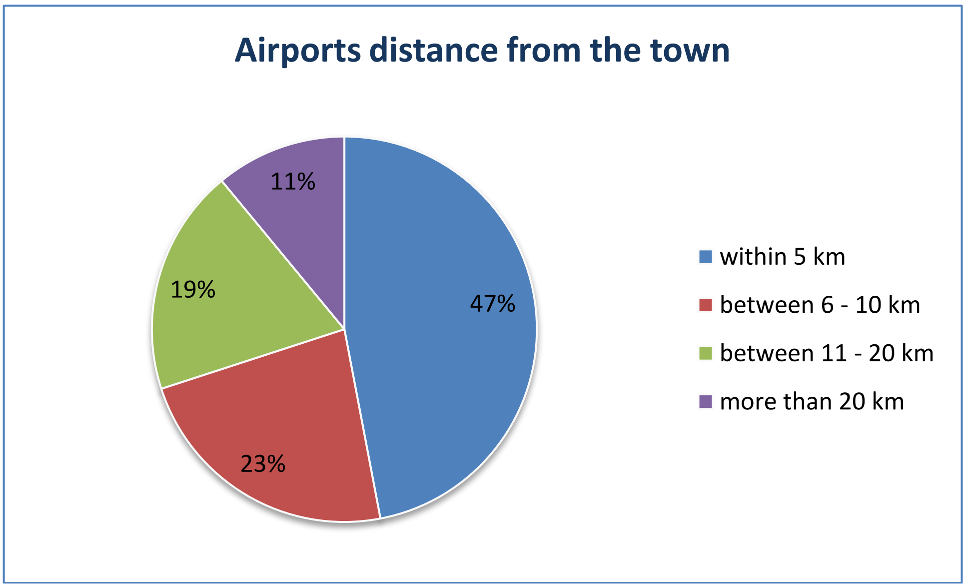
The Italian airports network is in line with the main European countries, in relation to population and territorial extension: the ratio is 1 airport for 1,27 million inhabitants and per 6,400 square kilometers.

On the contrary, in other European countries air traffic is less concentrated at major airports with more than 10 million passengers and it is more divided among medium airports.

ITALIAN AIRPORTS BY VOLUME OF TRAFFIC

1. ROMA FCO
2. MILANO MXP
3. MILANO LIN
4. BERGAMO
5. VENEZIA
6. CATANIA
7. NAPOLI
8. BOLOGNA
9. ROMA CIA
10. PALERMO
11. PISA
12. TORINO
13. CAGLIARI
14. BARI
15. VERONA
16. TREVISO
17. LAMEZIA T.
18. FIRENZE
19. TRAPANI
20. OLBIA
21. BRINDISI
22. ALGHERO
23. GENOVA
24. TRIESTE
25. FORLI’
26. RIMINI
27. REGGIO CALABRIA
28. ANCONA
29. PESCARA
30. PARMA
31. CUNEO
32. BRESCIA
33. LAMPEDUSA
34. PANTELLERIA
35. PERUGIA
36. CROTONE
37. FOGGIA
38. TORTOLI’
39. ELBA
40. GROSSETO
41. BOLZANO
42. TARANTO
43. SIENA
44. SALERNO
45. AOSTA
46. ALBENGA
47. COMISO

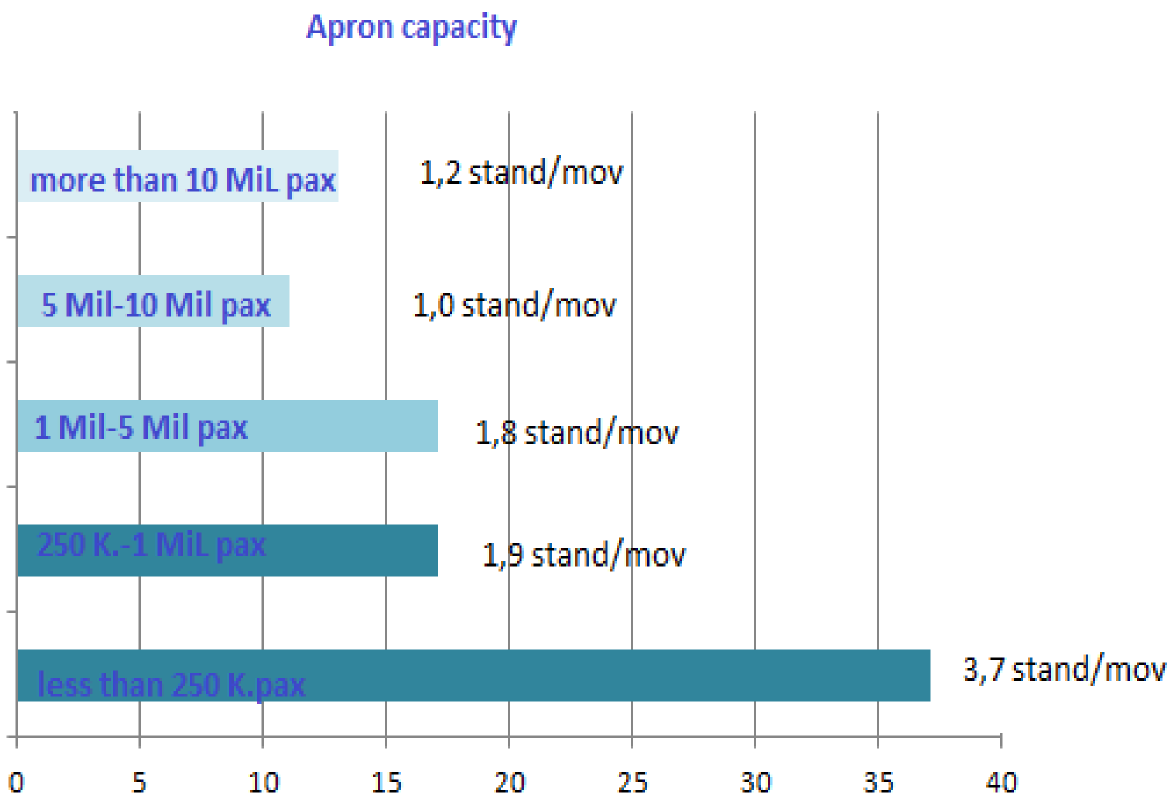
Map of airports close to the Italian chief towns



ITALY – CURRENT CAPACITY OF AIRPORTS

Apron capacity

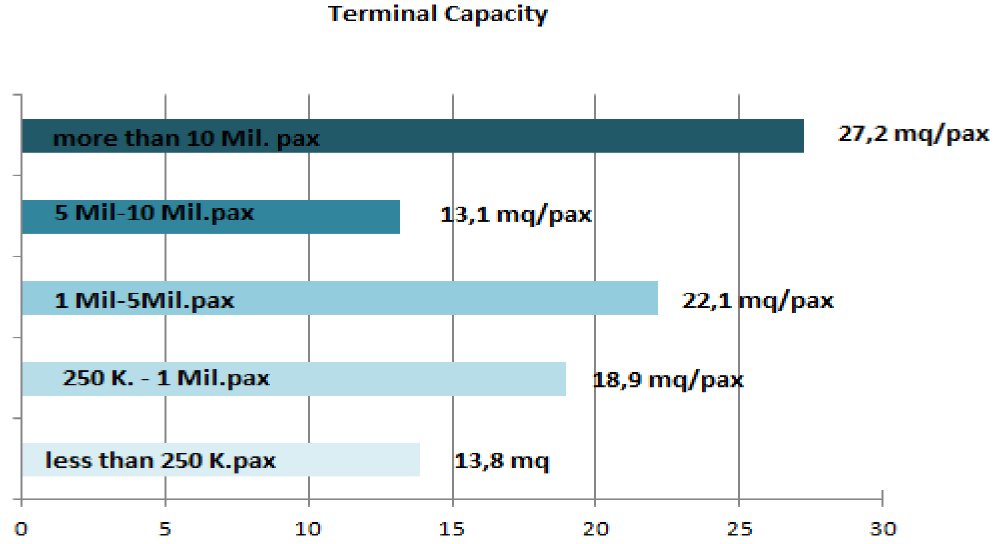
Total stand	**1067**
Hourly average capacity	**16 mov/h**
Average standard	**2,2 stand/mov. hour**
	1 stand/1600 mov. year



Terminals capacity

Terminals total gross area **1.300.000 sq.feet**

Average per pax **20 sq feet**

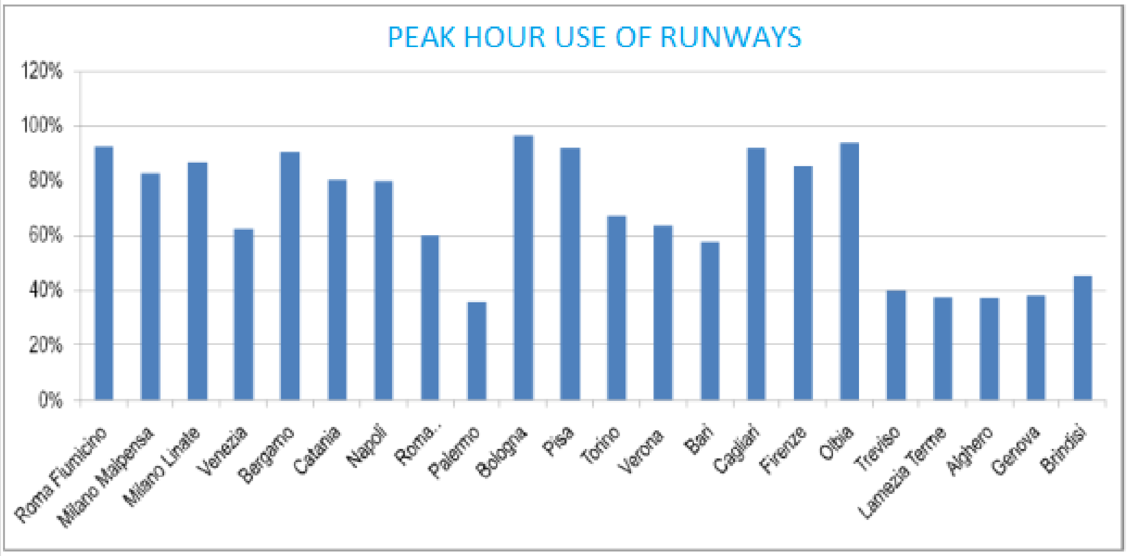


Runways capacity

Hourly average capacity **16 mov/h**

Average capacity utilization **26%**

Peak-hour – average capacity utilization **49%**



2.3 Air services demand

Air traffic is not uniformly distributed in the country, compared to overall levels of population and the characteristics of economic development.

USE OF AIR SERVICE AND GDP

North West
North East
Center North
Center
South

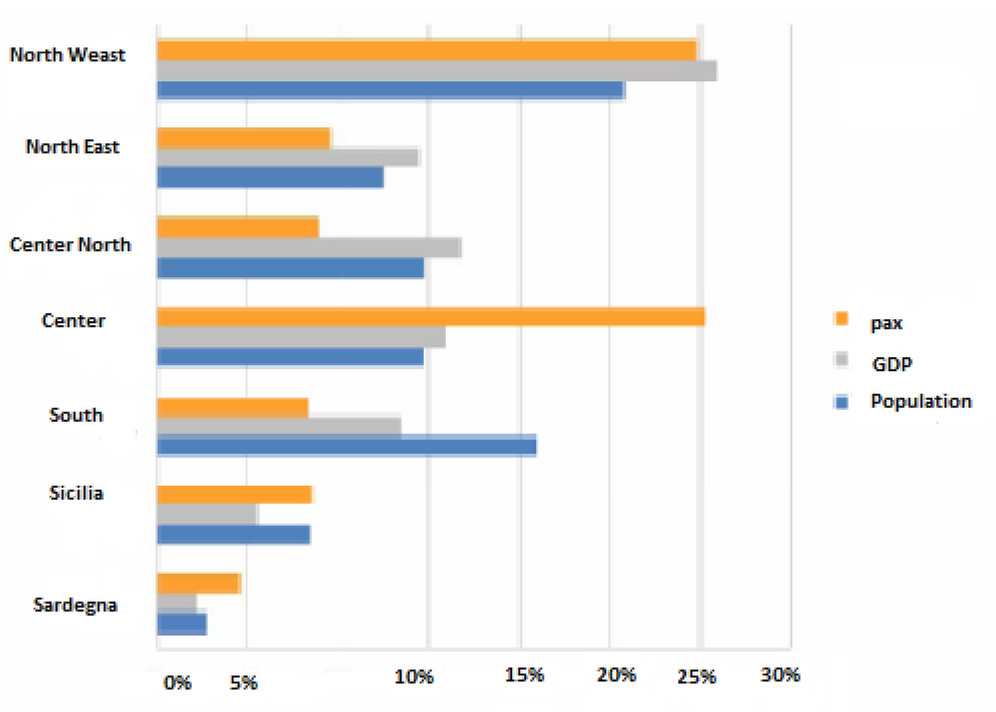
Area	Population * inhabitans	GDP * €/inhabitants	Passengers
North West	15.375.808	31.034	39.651.423
North East	7.465.333	29.965	12.754.041
Center North	8.799.887	29.472	11.890.068
Center	8.769.318	27.990	40.100.157
South	19.181.944	17.105	28.504.539
Total	59.619.290	25.921	132.900.228

Data 2008

In Italy in 2010 the index of propensity to fly stood at 2.3 pax/inhab, compared to the average of the main countries in Western Europe by 2.8 pax/inhab.

The level of air services market in Italy is still small in relation to population and economic indicators.

International traffic is the segment in which Italy has the greatest potential for growth.



3. Supra-national actions, including those led by the EU

AIRCRAFT RELATED TECHNOLOGY DEVELOPMENT

Aircraft emissions standards

European states fully support the ongoing work in ICAO's Committee on Aviation Environmental Protection (CAEP) to develop an aircraft CO_2 standard. Assembly Resolution A37-19 requests the Council to develop a global CO_2 standard for aircraft aiming for 2013. It is recognised that this is an ambitious timeframe for the development of a completely new ICAO standard. Europe is contributing to this task notably through the European Aviation Safety Agency providing the co-rapporteurship of the CO_2 task group within CAEP's Working Group 3.

In the event that a standard, comprising certification requirement and regulatory level, is adopted in 2013, it is likely to have an applicability date set some years in the future. The contribution that such a standard will make towards the global aspirational goals will of course depend on the regulatory level that is set, but it seems unlikely that an aircraft CO_2 standard would have any significant effect on the fuel efficiency of the global in-service fleet until well after 2020.

Research and development

Clean Sky is a **Joint Technology Initiative** (JTI) that aims to develop and mature breakthrough "clean technologies" for Air Transport. By accelerating their deployment, the JTI will contribute to Europe's strategic environmental and social priorities, and simultaneously promote competitiveness and sustainable economic growth.

Joint Technology Initiatives are specific large scale research projects created by the European Commission within the 7th Framework Programme (FP7) in order to allow the achievement of ambitious and complex research goals. Set up as a Public Private Partnership between the European Commission and the European aeronautical industry, Clean Sky will pull together the research and technology resources of the European Union in a coherent, 7-year, €1.6 bn programme, and contribute significantly to the 'greening' of aviation.

The Clean Sky goal is to identify, develop and validate the key technologies necessary to achieve major steps towards the Advisory Council for Aeronautics Research in Europe (ACARE) environmental goals for 2020 when compared to 2000 levels:

- Fuel consumption and carbon dioxide (CO_2) emissions reduced by 50%
- Nitrous oxides (NO_X) emissions reduced by 80%
- Perceived external noise reduction of 50%
- Improved environmental impact of the lifecycle of aircraft and related products.

Three complementary instruments are used by Clean Sky in meeting these goals:

Technologies. These are selected, developed and monitored in terms maturity, or "technology readiness level" (TRL). A detailed list of more than one hundred key technologies has been set. The technologies developed by Clean Sky will cover all major segments of commercial aircraft.

Concept Aircraft. These are design studies dedicated to integrating technologies into a viable conceptual configuration, and assessing their potential and relevance. They cover a broad range of aircraft: business jets, regional and large commercial aircraft, as well as rotorcraft. They have been grouped and categorised in order to represent the major future aircraft families. Clean Sky's environmental results will be measured and reported principally by Concept Aircraft.

Demonstration Programmes. These include Demonstrators that integrate several technologies at a larger "system" or aircraft level. Their role is to validate their feasibility in relevant (in-flight or operating) conditions. This in turn determines the true potential of the technologies and enables a realistic environmental assessment. Demonstrations enable technologies to reach a higher level of maturity (or "TRL"), which is the "raison d'être" of Clean Sky. Engine and Systems technologies are monitored through in-flight or large scale ground demonstrations.

The environmental objectives of the programme are determined by evaluating the performance of concept aircraft in the global air transport system (when compared to 2000 level technology and to "business as usual" evolution of technology).

The ranges of environmental improvements result from the sum of technologies which are expected to reach TRL5-6 within the programme timeframe. While not all of these technologies will be developed directly through the Clean Sky programme, it is neither feasible nor relevant at this stage to isolate the benefits derived purely from Clean Sky technologies, as Clean Sky will achieve a significant synergy effect in European Aeronautics Research by maturing closely linked technologies to a materially higher TRL through demonstration and integration.

While some technologies can be assessed during their development phase, many key technologies will need to be validated at an integrated vehicle or system level via dedicated demonstrators.

The Demonstrators will combine several technologies at a major system or sub-system level, and enable them to be evaluated in a relevant environment. Their performance can then be more reliably predicted in areas such as mechanical or in-flight behaviour. Demonstrations thus enable technologies to reach a high level of maturity. This in turn will be essential in order to assess the environmental improvements that are achievable.

Clean Sky activities are performed within six “Integrated Technology Demonstrators” (ITDs) and a “Technology Evaluator”.

The three vehicle-based ITDs will develop, deliver and integrate technologies into concrete aircraft configurations. The two “transversal” ITDs are focused on propulsion and systems, and will deliver technologies, which will be integrated in various aircraft configurations by the vehicle ITDs.

Smart Fixed Wing Aircraft (SFWA) – co-led by Airbus and SAAB - will deliver innovative wing technologies together with new aircraft configurations, covering large aircraft and business jets. Key enabling technologies from the transversal ITDs, for instance Contra Rotating Open Rotor, will be integrated into the demonstration programmes and concept aircraft.

Green Regional Aircraft (GRA) – co-led by Alenia and EADS CASA - will develop new technologies for the reduction of noise and emissions, in particular advanced low-weight & high performance structures, incorporation of all-electric systems, bleed-less engine architecture, low noise/high efficiency aerodynamics, and finally environmentally optimised mission and trajectory management.

Green Rotorcraft (GRC) – co-led by AgustaWestland and Eurocopter - will deliver innovative rotor blade technologies for reduction in rotor noise and power consumption, technologies for lower airframe drag, environmentally friendly flight paths, the integration of Diesel engine technology, and advanced electrical systems for elimination of hydraulic fluids and for improved fuel consumption.

Sustainable and Green Engines (SAGE) - co-led by Rolls-Royce and Safran - will design and build five engine demonstrators to integrate technologies for low fuel consumption, whilst reducing noise levels and nitrous oxides. The 'Open Rotor' is the target of two demonstrators. The others address geared turbofan technology, low pressure stages of a three-shaft engine and a new turboshaft engine for helicopters.

Systems for Green Operations (SGO) - co-led by Liebherr and Thales - will focus on all electrical aircraft equipment and system architectures, thermal management, capabilities for environmentally-friendly trajectories and missions, and improved ground operations to give any aircraft the capability to fully exploit the benefits of the "Single European Sky".

Eco-Design - co-led by Dassault and Fraunhofer Gesellschaft - will support the ITDs with environmental impact analysis of the product life-cycle. Eco-Design will focus on environmentally-friendly design and production, withdrawal, and recycling of aircraft, by optimal use of raw materials and energies, thus improving the environmental impact of the entire aircraft life-cycle.

Complementing these six ITDs, the **Technology Evaluator (TE)** is a dedicated evaluation platform cross-positioned within the Clean Sky project structure. The TE is co-led by DLR and Thales, and includes the major European aeronautical research organisations. It will assess the environmental impact of the technologies developed by the ITDs and integrated into the Concept Aircraft. By doing this, the TE will enable Clean Sky to measure and report the level of success in achieving the environmental objectives, and in contributing towards the ACARE environmental goals. Besides a mission level analysis (aircraft level), the positive impact of the Clean Sky technologies will be shown at a relevant hub airport environment and across the global air transport system.

The first assessment by the Technology Evaluator on the way to meeting Clean Sky's environmental objectives is planned for the end of 2011. The ranges of potential performance improvement (reduction in CO_2, NO_X and Noise) will be narrowed or evolved during the life of the programme based on the results from the key technologies developed and validated through the demonstrations performed.

Clean Sky is a ‘living’ programme: each year, Annual Implementation Plans are produced and agreed, and research priorities are (re-)calibrated based on results achieved. The best approach to progressing the technologies is pursued. The Clean Sky JU uses regular Calls for Proposals to engage with the wider aeronautical industry, research organisations and universities in order to bring the best talent on board and enable broad collaborative participation. A very significant share of the Clean Sky research programme is already being taken on by Europe’s aerospace related SMEs, and by September 2011 nine Calls for Proposals will have been completed, demonstrating the JU's commitment to involving all competent organisations in the European aeronautics research arena. In June 2011, a major and exciting milestone was reached with the 400th partner joining the Clean Sky programme.

ALTERNATIVE FUELS

European Advanced Biofuels Flightpath

In February 2009, the European Commission's Directorate General for Energy and Transport initiated the SWAFEA (Sustainable Ways for Alternative Fuels and Energy for Aviation) study to investigate the feasibility and the impact of the use of alternative fuels in aviation. The goal was to provide the European Commission with information and decision elements to support its future air transport policy, in the framework of the European commitment to promote renewable energy for the mitigation of climate change, security of supply and also to contribute to Europe's competitiveness and economic growth.

The study team involved 20 European and international organisations, representing all players in alternative aviation fuels: aircraft and engine manufacturing, air transport, oil industry, research and consulting organisations covering a large spectrum of expertise in the fields of fuel, combustion, environment as well as agriculture.

The SWAFEA final report was published in July 2011. It provides a comprehensive analysis on the prospects for alternative fuels in aviation, including an integrated analysis of technical feasibility, environmental sustainability (based on the sustainability criteria of the EU Directive on renewable energy) and economic aspects. It includes a number of recommendations on the steps that should be taken to promote the take-up of sustainable biofuels for aviation in Europe.

In March 2011, the European Commission published a White Paper on transport. In the context of an overall goal of achieving a reduction of at least 60% in greenhouse gas emissions from transport by 2050 with respect to 1990, the White Paper established a goal of low-carbon sustainable fuels in aviation reaching 40% by 2050.

As a first step towards delivering this goal, in June the European Commission, in close coordination with Airbus, leading European airlines (Lufthansa, Air France/KLM, & British Airways) and key European biofuel producers (Choren Industries, Neste Oil, Biomass Technology Group and UOP), launched the

European Advanced Biofuels Flightpath. This industry-wide initiative aims to speed up the commercialisation of aviation biofuels in Europe, with the objective of achieving the commercialisation of sustainably produced paraffinic biofuels in the aviation sector by reaching a 2 million tons consumption by 2020.

This initiative is a shared and voluntary commitment by its members to support and promote the production, storage and distribution of sustainably produced drop-in biofuels for use in aviation. It also targets establishing appropriate financial mechanisms to support the construction of industrial "first of a kind" advanced biofuel production plants. The Biofuels Flight path is explained in a technical paper, which sets out in more detail the challenges and required actions.

More specifically, the initiative focuses on the following:

- Facilitate the development of standards for drop-in biofuels and their certification for use in commercial aircraft;
- Work together with the full supply chain to further develop worldwide accepted sustainability certification frameworks
- Agree on biofuel take-off arrangements over a defined period of time and at a reasonable cost;
- Promote appropriate public and private actions to ensure the market uptake of paraffinic biofuels by the aviation sector;
- Establish financing structures to facilitate the realisation of 2G biofuel projects;
- Accelerate targeted research and innovation for advanced biofuel technologies, and especially algae.
- Take concrete actions to inform the European citizen of the benefits of replacing kerosene by certified sustainable biofuels.

The following “Flight Path” provides an overview about the objectives, tasks, and milestones of the initiative.

Time horizons	**Action**	**Aim/Result**

Short-term **(next 0-3 years)**	Announcement of action at International Paris Air Show	To mobilise all stakeholders including Member States.
	High level workshop with financial institutions to address funding mechanisms.	To agree on a "Biofuel in Aviation Fund".
Time horizons	**Action**	**Aim/Result**
Short-term **(next 0-3 years)**	Production of aviation class biofuels in the hydrotreated vegetable oil (HVO) plants from sustainable feedstock	Regular testing and eventually few regular flights with HVO biofuels from sustainable feedstock.
	Secure public and private financial and legislative mechanisms for industrial second generation biofuel plants.	To provide the financial means for investing in first of a kind plants and to permit use of aviation biofuel at economically acceptable conditions.
	Biofuel purchase agreement signed between aviation sector and biofuel producers.	To ensure a market for aviation biofuel production and facilitate investment in industrial 2G plants.
	Start construction of the first series of 2G plants.	Plants are operational by 2015-16.
	Identification of refineries & blenders which will take part in the first phase of the action.	Mobilise fuel suppliers and logistics along the supply chain.
Mid-term **(4-7 years)**	2000 tons of algal oils are becoming available.	First quantities of algal oils are used to produce aviation fuels.

	Supply of 1.0 M tons of hydrotreated sustainable oils and 0.2 tons of synthetic aviation biofuels in the aviation market.	1.2 M tons of biofuels are blended with kerosene.
	Start construction of the second series of 2G plants including algal biofuels and pyrolytic oils from residues.	Operational by 2020.
Long-term **(up to 2020)**	Supply of an additional 0.8 M tons of aviation biofuels based on synthetic biofuels, pyrolytic oils and algal biofuels.	2.0 M tons of biofuels are blended with kerosene.
	Further supply of biofuels for aviation, biofuels are used in most EU airports.	Commercialisation of aviation biofuels is achieved.

IMPROVED AIR TRAFFIC MANAGEMENT AND INFRASTRUCTURE USE

Single European Sky and SESAR

The Single European Sky initiative was originally launched by the European Commission in 1999. Its fundamental aim is to reform the architecture of European air traffic control to meet future capacity and safety needs. Its main principles are to reduce fragmentation in European air traffic management, between states, between civil and military, and between systems; to introduce new technology; and to establish a new regulatory framework built on closer synergy between the EU and Eurocontrol.

The first package of Single European Sky legislation was adopted by the Council and European Parliament in 2004. This was followed in 2009 by the Single European Sky II package of measures, which comprises five main pillars: performance, safety, technology, airport capacity and the human factor. The aim is to improve the performance of air navigation services by reducing the cost of flights, while improving the capacity and better preserving the environment, all having regard to the overriding safety objectives.

Reducing fragmentation in European air traffic management is expected to result in significant efficiency and environmental improvements. A core starting point is the reduction of the current surplus length of flights in Europe, estimated on average to be almost 50 km. The defragmentation of European airspace with new possibilities for more direct routing, and efforts to define a true pan European network of routes and to implement flexible use of airspace are expected to result in emission reductions of 2% per year.

SESAR

SESAR (Single European Sky ATM Research) is the technological component of the Single European Sky (SES). It is a €2.1bn Joint Undertaking, funded equally by the EU, Eurocontrol and industry (€700m EU, €700m Eurocontrol, €700m industry). Fifteen companies are members of the SESAR JU: AENA, Airbus, Alenia Aeronautica, the DFS, the DSNA, ENAV, Frequentis, Honeywell, INDRA, NATMIG, NATS (En Route) Limited, NORACON, SEAC, SELEX Sistemi Integrati and Thales. The SESAR SJU includes an additional thirteen associate partners including non-European companies with different profiles and expertise.

SESAR aims to help create a "paradigm shift" by putting performance-based operations at the core of air traffic management's objectives, and will be supported by state-of-the-art and innovative technology capable of ensuring the safety, sustainability and fluidity of air transport worldwide over the next 30 years. It is composed of three phases:

- The Definition phase (2004-2008) delivered the ATM master plan defining the content, the development and deployment plans of the next generation of ATM systems. This definition phase was led by Eurocontrol, and co-funded by the European Commission under the Trans European Network- Transport programme and executed by a large consortium of all air transport stakeholders.
- The Development phase (2008-2013) will produce the required new generation of technological systems, components and operational procedures as defined in the SESAR ATM Master Plan and Work Programme.
- The Deployment phase (2014-2020) will see the large scale production and implementation of the new air traffic management infrastructure, composed of fully harmonised and interoperable components guaranteeing high performance air transport activities in Europe.

Implementation of SESAR in general will facilitate the following:

- Moving from airspace to trajectory based operations, so that each aircraft achieves its agreed route and time of arrival and air and ground systems share a common system view.
- Collaborative planning so that all parties involved in flight management from departure gate to arrival gate can strategically and tactically plan their business activities based on the performance the system will deliver.
- An information rich ATM environment where partners share information through system wide information management.
- A globally agreed 4D trajectory definition and exchange format at the core of the ATM system where time is the 4th dimension providing a synchronised “time” reference for all partners.
- Airspace users and aircraft fully integrated as essential constituents and nodes of the ATM system.
- Dynamic airspace management and integrated co-ordination between civil and military authorities optimising the available airspace.
- Network planning focused on the arrival time as opposed to today’s departure based system with Airport airside and turn-around fully integrated into ATM.

- New Communication, Navigation & Surveillance (CNS) technologies providing for more accurate airborne navigation and spacing between aircraft to maximise airspace and airport efficiency, improve communication and surveillance.
- Central role for the human widely supported by automation and advanced tools ensuring safe working without undue pressure.

Within the SESAR programme most out of the almost 300 projects include environmental aspects of aviation. They concern aircraft noise management and mitigation, aircraft fuel use and emissions management etc. throughout all of SESAR's 16 work packages. The Joint Undertaking's role is to establish environmental sustainability as an integral aspect of broader ATM development and operating processes.

SESAR aims at reducing the environmental impact per flight by 10% without compromising on safety but with clear capacity and cost efficiency targets in mind. More specifically, in addressing environmental issues, SESAR will:

a. Achieve emission improvements through the optimisation of air traffic management services. The SESAR target for 2020 is to enable 10% fuel savings per flight as a result of ATM improvements alone, leading to a 10% reduction of CO_2 emissions per flight;

b. Improve the management of noise emissions and their impacts through better flight paths, or optimised climb and descent solutions;

c. Improve the role of ATM in enforcing local environmental rules by ensuring that flight operations fully comply with aircraft type restrictions, night movement bans, noise routes, noise quotas, etc.;

d. Improve the role of ATM in developing environmental rules by assessing the ecological impact of ATM constraints, and, following this assessment, adopting the best alternative solutions from a European sustainability perspective.

e. Accompany the development of new procedures and targets with an effective regulatory framework in close cooperation with the European Commission;

f. Implement more effective two-way community relations and communications capabilities at local and regional levels including a commonly agreed environmental strategy and vision.

By 2012 SESAR is expected to deliver fuel burn reductions of approximately 2% (compared with a baseline 2010), to demonstrate environmental benefits on city pairs connecting 8 European airports, and to have airspace users signing up to the SESAR business case (including the environment case) for time-based operations.

Operational improvements: AIRE

The Atlantic Interoperability Initiative to Reduce Emissions (AIRE) is a programme designed to improve energy efficiency and lower engine emissions and aircraft noise in cooperation with the US FAA. The SESAR JU is responsible for its management from a European perspective.

Under this initiative ATM stakeholders work collaboratively to perform integrated flight trials and demonstrations validating solutions for the reduction of CO_2 emissions for surface, terminal and oceanic operations to substantially accelerate the pace of change.

AIRE has demonstrated in 2009, with 1,152 trials performed, that significant savings can be achieved using existing technology. CO_2 savings per flight ranged from 90kg to 1250kg and the accumulated savings during trials were equivalent to 400 tons of CO_2. Another positive aspect is the human dimension - the AIRE projects boost crew and controller motivation to pioneer new ways of working together focusing on environmental aspects, and enabled cooperative decision-making towards a common goal.

The strategy is to produce constant step-based improvements, to be implemented by each partner in order to contribute to reaching the common objective. In 2010 demand for projects has more than doubled and a high transition rate from R&D to day-to-day operations, estimated at 80%, from AIRE 2009 projects was observed (expected to further increase with time). Everyone sees the “AIRE way of working together” as an absolute win-win to implement change before the implementation of more technology intensive ATM advancements expected for the period 2013 onward. A concrete example of the progress achieved is that, due to AIRE, both FAA and NAV Portugal, offer lateral optimisation over the transatlantic routes to any user upon request. In July 2010, the SESAR JU launched a new call for tender and had an excellent response - 18 projects were selected involving 40 airlines, airport, air navigation service providers and industry partners. More than 5,000 trials are expected to take place.

ECONOMIC / MARKET-BASED MEASURES

The EU Emissions Trading System

The EU Emissions Trading System (EU ETS) is a cornerstone of the European Union's policy to combat climate change and its key tool for reducing industrial greenhouse gas emissions cost-effectively. Being the first and biggest international scheme for the trading of greenhouse gas emission allowances, the EU ETS currently covers some 11,000 power stations and industrial plants in 30 countries.

Launched in 2005, the EU ETS works on the "cap and trade" principle. This means there is a "cap", or limit, on the total amount of certain greenhouse gases that can be emitted by the factories, power plants and other installations in the system. Within this cap, companies receive emission allowances which they can sell to or buy from one another as needed. The limit on the total number of allowances available provides certainty that the environmental objective is achieved and ensures that the allowances have a market value.

At the end of each year each company must surrender enough allowances to cover all its emissions, otherwise heavy fines are imposed. If a company reduces its emissions, it can keep the spare allowances to cover its future needs or else sell them to another company that is short of allowances. The flexibility that trading brings ensures that emissions are cut where it costs least to do so. The number of allowances is reduced over time so that total emissions fall.

The EU ETS now operates in 30 countries (the 27 EU Member States plus Iceland, Liechtenstein and Norway). It currently covers CO_2 emissions from installations such as power stations, combustion plants, oil refineries and iron and steel works, as well as factories making cement, glass, lime, bricks, ceramics, pulp, paper and board. Between them, the installations currently in the scheme account for almost half of the EU's CO_2 emissions and 40% of its total greenhouse gas emissions.

Airlines join the scheme in 2012. The EU ETS will be further expanded to the petrochemicals, ammonia and aluminium industries and to additional gases (PFCs and N_2O) in 2013, when the third trading period starts. At the same time a series of important changes to the way the EU ETS works will take effect in order to strengthen the system.

The legislation to include aviation in the EU ETS was adopted in November 2008, and entered into force as Directive 2008/101/EC of the European Parliament and of the Council on 2 February 2009. The proposal to include aviation in the EU ETS, made by the European Commission in December 2006, was accompanied by a detailed impact assessment.

Under the EU ETS, the emissions cap is increased to accommodate the inclusion of aviation. This addition to the cap establishes the total quantity of allowances to be allocated to aircraft operators. This quantity is defined as a percentage of historical aviation emissions, which is defined as the mean average of the annual emissions in the calendar years 2004, 2005 and 2006 from aircraft performing an aviation activity falling within the scope of the legislation. In July 2011, it was decided that the historical aviation emissions are set at 221,420,279 tonnes of CO_2.

The additional cap to be added to the EU ETS in 2012, the first year of operation for aviation, will be set at 97% of the historical aviation emissions. For the period from 2013 to 2020 inclusive the additional cap will be set at 95% of the historical aviation emissions.

Aircraft operators flying to and from airports in 30 European states from 2012 will be required to surrender allowances in respect of their CO_2 emissions on an annual basis. The large majority of allowances will be allocated to individual aircraft operators free of charge, based on their respective aviation output (rather than emissions) in 2010, thus rewarding operators that have already invested in cleaner aircraft. In 2012, 85% of the total quantity of the additional allowances (or "cap") will be allocated free of charge according to this benchmarking methodology, while in the 2013-2020 trading period 82% of the additional allowances will be allocated free of charge in this way. In the 2013-2020 trading period, an additional 3% of the total additional allowances for aviation will be set aside for allocation free of charge via the special reserve, to new entrants and fast-growing airlines. The remaining 15% of allowances will be allocated each year by auction.

Aircraft operators that choose to emit more than their free allocation of allowances will be able to source allowances from other participants in the ETS (including those outside the aviation sector), from intermediaries who trade allowances, from Member States via auctions, or they can use specific quantities of international credits from emissions reduction projects in third countries (e.g. CDM credits and ERUs).

The system also includes a de minimis provision under which commercial aircraft operators with a low level of aviation activity in Europe are excluded from its scope. This is likely to mean that many aircraft operators from developing countries will be unaffected by the scheme and, indeed, over 90 ICAO states have no commercial aircraft operators included in the scope of the EU ETS.

The EU legislation foresees that, where a third country takes measures of its own to reduce the climate change impact of flights departing from its airports, the EU will consider options available in order to provide for optimal interaction between the EU scheme and that country's measures. In such a case, flights arriving from the third country could be excluded from the scope of the EU scheme. The EU therefore encourages other countries to adopt measures of their own and is ready to engage in bilateral discussions with any country that has done so.

The legislation also makes it clear that if there is agreement on global measures, the EU shall consider whether amendments to this Directive as it applies to aircraft operators are necessary.

Anticipated change in fuel consumption and/or CO_2 emissions

The environmental outcome of an emissions trading system is pre-determined through the setting of an emissions cap. In the case of the EU ETS, an addition to the overall cap is established for aviation emissions. However, aircraft operators are also able to use allowances allocated to other sectors to cover their emissions. It is therefore possible (indeed highly likely given traffic growth forecasts) that the absolute level of CO_2 emissions from aviation will exceed the number of allowances allocated to aviation. However, any aviation emissions will necessarily be offset by CO_2 emissions reductions elsewhere, either in other sectors within the EU that are subject to the EU ETS, or through emissions reduction projects in third countries. The "net" aviation emissions will however be the same as the number of allowances allocated to aviation under the EU ETS.

In terms of contribution towards the ICAO global goals, the states implementing the EU ETS will together deliver, in "net" terms, a 3% reduction below the 2005 level of aviation CO_2 emissions in 2012, and a 5% reduction below the 2005 level of aviation CO_2 emissions in the period 2013-2020.

Other emissions reduction measures taken, either at supra-national level in Europe or, by any of the 30 individual states implementing the EU ETS, will of course make their own contribution towards the ICAO global goals. Such measures are likely to moderate the anticipated growth in aviation emissions in Europe and therefore reduce the extent to which the absolute level of CO_2 emissions from aviation will exceed the number of allowances allocated to aviation. However, assuming that absolute aviation emissions will nonetheless in future exceed the additional aviation cap, the aggregate contribution towards the global goals is likely to remain that which is determined by the EU ETS cap.

Expected co-benefits

The EU ETS covers both international and domestic aviation and does not distinguish between them. It is not therefore possible to identify how the “net” emissions reductions it delivers are apportioned between international and domestic aviation.

Support to voluntary actions :ACI Airport Carbon Accreditation

Airport Carbon Accreditation is a certification program for carbon management at airports, which was launched in 2009. It is based on the first ever carbon mapping and management standard specifically designed for the airport industry. It has been set up by ACI EUROPE, the trade association for European airports, representing over 400 airports in 46 countries. These airports account for over 90% of commercial air traffic in Europe.

This industry-driven initiative was officially endorsed by Eurocontrol and the European Civil Aviation Conference (ECAC). It is also officially supported by the United Nations Environmental Programme (UNEP). The programme is overseen by an independent Advisory Board. ACI EUROPE is looking at expanding the geographical scope of the programme through the other ACI regions. Discussions are currently under way with ACI Asia Pacific for a possible extension of the programme to the Asia Pacific region.

It is a four-step program, from carbon mapping to carbon neutrality. The four steps of certification are: Level 1 “Mapping”, Level 2 “Reduction”, Level 3 “Optimisation”, and Level 3+ “Carbon Neutrality”. One of its essential requirements is the verification by external and independent auditors of the data provided by airports. Aggregated data are included in the *Airport Carbon Accreditation* Annual Report thus ensuring transparent and accurate carbon reporting.

At level 2 of the program and above (Reduction, Optimization and Carbon Neutrality), airport operators are required to demonstrate CO2 reduction associated with the activities they control.

In June 2011, 2 years after the launch of the programme, 43 airports were accredited, representing 43% of European passenger traffic. The objective for the end of the 3rd year of the programme's operation is to cover airports representing 50% of European passenger traffic. Programme's implementation is twofold: on top of recruiting new participants, individual airports should progress along the 4 levels of the programme.

Anticipated benefits:

The Administrator of the program has been collecting CO2 data from participating airports over the past two years. This allows us to quantify the absolute CO2 reduction from the participation in the program.

	2009-2010	2010-2011
Total aggregate scope 1 & 2 reduction (tCO2)	51,657	54,565
Total aggregate scope 3 reduction (tCO2)	359,733	675,124

Variable	**Year 1**		**Year 2**	
	Emissions	**Number of**	**Emissions**	**Number of airports**

		airports		
Aggregate carbon footprint for 'year 0'[1] for emissions under airports' direct control (all airports)	803,050 tonnes CO2	17	2,275,469 tonnes CO2	43
Carbon footprint per passenger	2.6 kg CO2		3.73 kgCO2	
Aggregate reduction in emissions from sources under airports' direct control (Level 2 and above)[2]	51,657 tonnes CO2	9	51,819 tonnes CO2	19
Carbon footprint reduction per passenger	0.351 kg CO2		0.11 kg CO2	
Total carbon footprint for 'year 0' for emissions sources which an airport may guide or influence (level 3 and above)	2,397,622 tonnes CO2	6	6,643,266 tonnes CO2[3]	13
Aggregate reductions from emissions sources which an airport may guide or	359,733 tonnes CO2		675,124 tonnes CO2	

1 'Year 0' refers to the 12 month period for which an individual airport's carbon footprint refers to, which according to the Airport Carbon Accreditation requirements must have been within 12 months of the application date.

2 This figure includes increases in emissions at airports that have used a relative emissions benchmark in order to demonstrate a reduction.

influence				
Total emissions offset (Level 3+)	13,129 tonnes CO_2	4	85,602 tonnes CO_2	8

Its main immediate environmental co-benefit is the improvement of local air quality.

Costs for design, development and implementation of *Airport Carbon Accreditation* have been borne by ACI EUROPE. *Airport Carbon Accreditation* is a non-for-profit initiative, with participation fees set at a level aimed at allowing for the recovery of the aforementioned costs.

The scope of *Airport Carbon Accreditation,* i.e. emissions that an airport operator can control, guide and influence, implies that aircraft emissions in the LTO cycle are also covered. Thus, airlines can benefit from the gains made by more efficient airport operations to see a decrease in their emissions during the LTO cycle. This is coherent with the objectives pursued with the inclusion of aviation in the EU ETS as of 1 January 2012 (Directive 2008/101/EC) and can support the efforts of airlines to reduce these emissions.

4. NATIONAL ACTIONS IN ITALY

4.1. National Framework of Climate Change - ITALY and Kyoto Protocol

The United Nations Framework Convention on Climate Change (UNFCCC) was ratified by Italy in 1994 .

The Kyoto Protocol established emission reduction objectives: in particular, the European Union as a whole is committed to an 8% reduction within the period 2008-2012, in comparison with base year levels. The EU burden sharing agreement has established for Italy a reduction objective of 6.5% in the commitment period, in comparison with 1990 levels.

As a Party to the Convention and the Kyoto Protocol since 2002, Italy is committed to developing, publishing and regularly updating national emission inventories of greenhouse gases (GHGs) as well as formulating and implementing programs to reduce these emissions.

In order to establish compliance with national and international commitments, the national GHG emission inventory is compiled annually by the Institute for Environmental Protection and Research (ISPRA) and communicated to the competent institutions. Detailed information on emission figures and estimation procedures, including all the basic data needed to carry out the final estimates, is to be provided to improve transparency, consistency, comparability, accuracy and completeness of the inventory provided.

The national inventory is updated annually in order to reflect revisions and improvements in the methodology and use of the best information available. It provides an analysis of the Italian GHG emission inventory communicated to the Secretariat of the Climate Change Convention and to the European Commission

The official inventory submissions can be found at the UNFCCC website http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php.

4.2. Italian civil aviation emissions

Civil aviation contributes mainly in rising CO2 emissions. In 2009 Italian total GHG emissions from this source category were about 1.8 per cent of the national total emissions from transport, and about 0.4 per cent of the GHG national total; in terms of CO2 only, the share is almost the same.

From 1990 to 2009, GHG emissions from the sector increased by 36% due to the expansion of the aviation transport mode.

Therefore, emission fluctuations over time are mostly dictated by the growth rates in the number of flights.

Hereunder Italian civil aviation emissions from 2001 to 2010*.

CO2 (Gg)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
a. Civil Aviation	2.423,53	2.424,95	2.414,77	2.231,30	2.204,10	2.290,66	2.427,79	2.301,35	2.197,18	2.319,33
Aviation Gasoline	33,83	36,90	46,13	43,05	43,05	49,20	46,13	27,68	52,28	58,43
Jet Kerosene	2.389,71	2.388,05	2.368,64	2.188,24	2.161,05	2.241,46	2.381,66	2.273,68	2.144,90	2.260,90
Aviation International Bunkers	8.011,06	7.312,69	8.526,80	8.620,09	9.110,86	9.833,14	10.430,30	10.087,15	8.968,33	9.440,35

* A national technique has been developed and applied to estimate emissions, according to the IPCC Guidelines and Good Practice Guidance (Tier 3) and the EMEP/CORINAIR Guidebook

4.3. National actions for sustainable development of air transport

It is unthinkable to limit the growth of air transport, given that aviation is the major push to global economic development. In Europe civil aviation provides more than 4 million jobs and contributes to its economy for about 230 billion Euros.

The overall goal of environmental strategies in the field of air transport is to balance the needs of industry growth with the fact that development must be environmentally sustainable. The emission reduction must be pursued through the adoption of appropriate technological, operational, infrastructural and economical measures.

To obtain concrete results, the measures identified by ICAO must be applied in a coordinated manner by all concerned, under the supervision of national civil aviation authorities. This supervision involves an objective complexity due to the multitude of stakeholders and to the difficulty of collecting consistent verifiable and complete data, to refer them to a common base year and to test the goal achieved by each proposal with an appropriate timing.

In any case, looking at Italian targets of emissions reduction it must be kept in mind that Italy joins the group of most aeronautically developed countries, both in Europe and worldwide, for airport infrastructures, configuration of the airline's fleet and optimization of the ATM.

Italy has already made several significant steps toward an environmental sustainable civil aviation, with actions individually taken by aeronautical operators and through an active participation in European programs.

Even though, in accordance with Resolution A37-19, national action plans should incorporate information on activities that aim to address CO_2 emissions from international aviation, Italy takes an holistic approach and considers the aviation sector as a whole.

Then, Italian action plan provides information about measures affecting both domestic and international operations and about emissions from airport and/or ground support equipment operations.

Therefore Italy is at the forefront in this field and our country is in a prime location in fulfilling the expectations for global emissions reduction, since policies and strategies for sustainable development of air transport have been already established.

4.4. Airport infrastructures and installations use

National obligations under Kyoto Protocol and the Agreement dated 10 December 2008 signed by all EU Member States led to the enactment of the European Directive 2006/32, which laid down the obligation for Member States to implement provisions related to energy efficiency improvements.

In this context ENAC, as regulator of the Italian civil aviation, is engaged in several initiatives aimed at developing a new environmentally conscious approach in the field of airport development, at stimulating the use of the most advanced technologies and scientific knowledge, at obtaining eco-sustainable airports.

During the years 2009-2010, ENAC launched a series of initiatives in order to achieve the following objectives in design, construction and management of airports:

• reduce energy consumption through efficiency in production and distribution systems and energy use;

• increase use of renewable sources in energy production processes;

• reduce water consumption;

• reuse of waste materials through a special treatment process;

• evaluation of a path for airports energy certification.

The improvement of energy efficiency of the terminal is therefore a significant indicator for CO_2 emission reduction. Data held by ENAC, concerning domestic airports serving more than 70% of passenger traffic, show that there is a tendency to an average annual improvement of energy efficiency of the terminals, which is approximately one percentage point per cubic meter of air terminal.

This is a significant result, taking into account that steady reduction in CO_2 produced by terminals will correspond, over time, to a larger number of movements (and therefore a greater flow of passengers), according to the growth forecast of more than 3% per annum by 2020.

In order to achieve these objectives, ENAC launched some specific studies and in case of topics of particular relevance it concluded research agreements with other entities.

The agreement signed between the Ministry of Environment and ENAC has a special importance. It is based on two lines of action.

The first one concerns the testing of innovative energy production from renewable energy combining high performance, compatibility with the airport functions and integration with the territory. This pilot project was launched at the Pantelleria and Lampedusa airports, which are directly managed by ENAC.

The second line of action is aimed at the definition of guidelines for implementation, at Italian airports, of infrastructures and systems characterized by a lower consumption of energy and therefore at involving a reduction of CO_2 levels through the production of energy from renewable energy sources.

In addition to these activities, falling within the above described Agreement for the Environment, ENAC has launched an airport energy and environmental management program.

The purpose of this program is to define general rules for:

• the verification of the existing situations, through organizational processes for the data collection and processing,

• the implementation of organizational processes of intervention and monitoring,

• the design of interventions to improve the energy production from renewable sources transforming existing plants,

• the design and construction of energy production from renewable energy sources. To achieve the best results, ENAC conducted a study with the La Sapienza University in Rome.

The study was divided into two phases.

The first phase examined good practices at the major international airports within the subsystems constituting the airport.

The second one defined energy efficient and environmentally friendly design indicators, even through the definition of various types of intervention for environmental improvement of the airport system.

ENAC also established a data bank on environmental parameters, collecting from airport operators data regarding resources used in energy production processes and CO_2 emissions.

This database will form the basis for the implementation of ecological and energy efficiency upcoming ENAC activities.

4.4.1. Airport carbon accreditation

Airport Carbon Accreditation is a 4 step-program certification for carbon management at airports, which was launched in 2009:

a) Mapping – level 1: calculation of emissions under the direct control of the airport operator

b) Reduction – level 2: in addition to level 1 requirements, creation of an emissions reduction plan that will achieve continuous reduction of emissions levels

c) Optimization – level 3: in addition to level 1 and 2 requirements, calculation of emissions produced by the various airport stakeholders and the involvement of the stakeholders in emissions reduction plans

d) Neutrality – level 3+ : in addition to level 1, 2 and 3 requirements, achievement of Carbon Neutrality for the emissions under the direct control of the airport operator

The following fixed and mobile CO_2 sources are considered in Airport Carbon Accreditation:

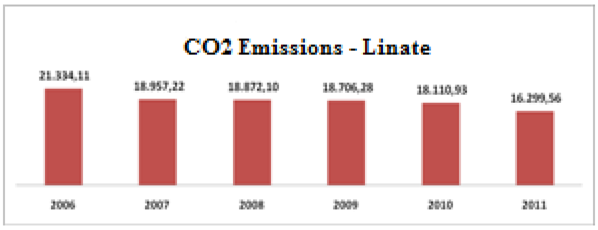
- heating/cooling plants;
- plants producing electrical power and heating/cooling;
- aircraft landing and take-off cycle (LTO);

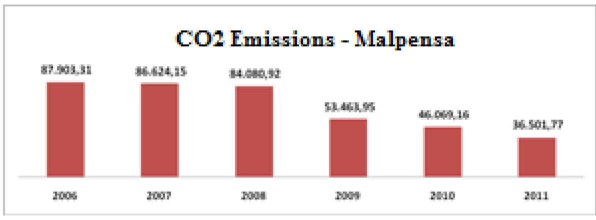
- equipment and facilities for all handling operations;
- vehicles used by employees;
- vehicles used by passengers.

Bologna Airport (BLQ) became accredited for the first time in year 1 at the Mapping level, and successfully renewed its accreditation during year 2.
Bologna Airport is defining its Carbon Management Plan, which should include a new cogeneration plan for energy production (heat, cool and electricity). Several interventions on existing plants and infrastructures (e.g. replacing old boilers with new generation condensing plants, installing LED lights, and electric handling vehicles) have been already made.

Case study: Milan airports

SEA has adhered to the Airport Carbon Accreditation Scheme since it was first launched in 2009 and achieved in the same year level 3 – "Optimization" (first one in Italy and one of the first airports in Europe) in the airports of Linate and Malpensa. In 2010, it reached level 3+ - "Neutrality" which was confirmed in 2011.
SEA SpA develops and manages the airports of Milan Malpensa and Milan Linate ensuring all services and activities concerning landing and departure of aircrafts, airport safety and security, handling of passengers and goods, development of commercial services to passengers, workers and visitors.
The results of the reduction (Scope 1 and 2) of CO2 emissions are positive over the past 6 years:





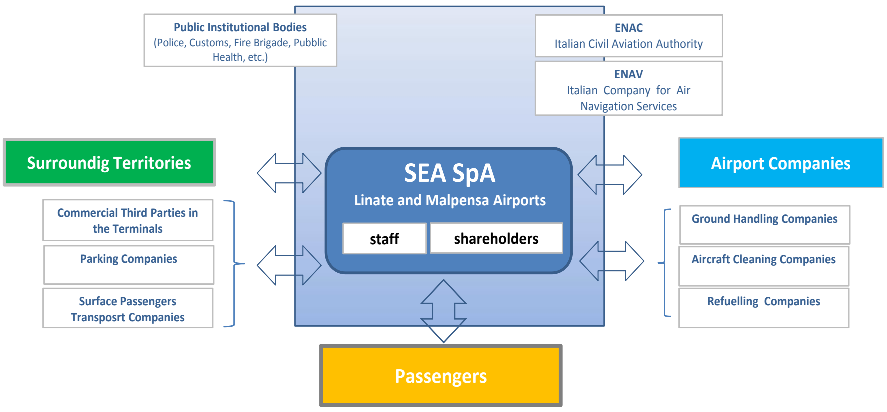
SEA directly employs more than 5000 people. The two airports have significantly different characteristics and locations.

The Linate airport has a total area of 350 hectares and a traffic volume of 9.5 mil passengers (2011). It is deeply embedded in the urban belt of Milan and its clientele is predominantly "frequent flyer" on the national and international routes (both within the European Union and outside it). Linate airport has two runways for landing and take-off: the first of 2,442 meters and the second 601 meters, intended for general aviation. The passenger terminal is spread over 75 000 square meters (about 33 000 of which are open to the public). It has 71 check-in counters and 24 gates, five of which are served by loading bridges. The cargo area has a warehouse for goods of some 16,800 square meters with a treatment capacity of 80-100 tons / year.

The Malpensa airport has a total area of 1,220 hectares and a traffic volume of 18.5 mil pax (2011). The airport has two passenger terminals, characterized by different types of traffic, and a freight terminal. Terminal 1 is dedicated to business and leisure travelers on domestic, international and intercontinental routes. Terminal 2 is dedicated to high segments of the low-cost traffic. Malpensa Airport is the first Italian airport for freight carried and a cargo site among the major European airports. It has two parallel runways, each 808 meters distant, 3,920 meters long and 185 stands each.

The SEA Environmental Management System is certified ISO 14001 since 2006.

The EMS considers: noise pollution, CO2 emissions, air pollution, the Energy management, water management and waste water, waste, landscape, electromagnetic pollution, light pollution and ionizing radiation. SEA has defined an Action Plan for the involvement of its key Stakeholders.



Each month, specific airport Committees are held both in Linate and Malpensa, involving airlines, handlers, all operating bodies, government organizations where on airport safety and environmental issues are discussed under the responsibility of SEA Environment and Airport Safety Manager.

SEA has made many important investments for the reduction of energy consumption. This result was made possible with the engagement of SEA Energy Manager and Maintenance Managers. The energy requirements of Linate and Malpensa is satisfied by two modern and efficient trigeneration plants.

Several successful initiatives concerning the rationalization of energy management were conducted such as different levels of conditioning the areas of the terminal, introduction of low consumption lamps, the replacement of the lighting towers, the renewal of the shuttle buses.

The deep involvement of the company management and shareholders in the field of environmental sustainability has seen the distribution, even in 2011, in the Assembly of Shareholders, of the Financial Statements and the Sustainability Report as official documents for the annual approval of SEA management results.

With ENAC a very innovative proposal, in Italy, has been discussed concerning the switch-off of the lights of the runway 35R at Malpensa Airport by night, thus obtaining significant savings in energy consumption. The project was approved. SEA has also provided support to ENAC for the establishment of the National Plan for Airports concerning the Reduction in CO2 emissions.

ENAV, while being fully independent in its operations, is strongly affected by SEA in the optimization of ground aircraft movement (Apron Management). A particularly good result, in Malpensa Airport, achieved through the effective involvement of both stakeholders, ENAC and ENAV, concerns the "traffic distribution". The Alitalia de-hubbing determined an unbalanced condition in air traffic distribution, at Malpensa Airport. The working group "SEA-ENAC-ENAV" optimized the situation redistributing the traffic on the SIDs, thus obtaining a very good results in overflights (hence emissions) rationalization and, as a consequence, noise reduction.

As to Innovation Energy Building Management, SEA is participating in two important European projects (approved by the Commission) as a “pilot - site” (Linate and Malpensa), working with a significant group of European players. In both projects, SEA emphasized Airport Carbon Accreditation initiative and its importance.

On the theme of young people, and especially school gap vs access to labour market, SEA has defined with the Lombardy Region a Memorandum of Understanding for specific contribution concerning climate change, energy and water. That act will determine specific fields of action from the 9th June 2012 through a direct involvement of SEA in the 4 regional “pilot schools” (Busto Arsizio, Brescia, Somma Lombardo, Milano) and other project initiatives at the regional and international level will be also defined with the Province of Varese (the institutional body for territorial management close to Malpensa Airport).

SEA Human Resources Department has set up a specific position called "CSR Manager" to enhance the internal sensitivity towards “social sustainability”.

SEA launched the Energy S(e)aving campaign for the use of energy and respect of environment, in general. This includes:

• a video which describes the company energy saving and gives SEA personnel suggestions and good practices on: the use of electric and electronic equipment and water consumptions in the working environment (office or other); the choices concerning home-office mobility and business travels; information and suggestions on energy saving at home.

• a t-shirt given to around 600 administrative male employees inviting them to renounce to their ties as a symbolic gesture for the energy saving.

• a shorter version of the above-mentioned video addressing all airport users.

• posters on energy saving and company policy in all public and operating areas.

SEA has been defined another Memorandum of Understanding on the wildlife management and conservation and it is also involved in a new initiative aimed at the creation of green areas in cooperation with the leading players in the territorial area.

4.5. Ground Support Equipments

To improve the GSEs performances in terms of emissions, in addition to the renewal of vehicles and equipment serving aircraft with the purchase of environmentally friendly vehicles, a series of measures can be applied, such as reducing distance traveled within airport areas and engine shut down as soon as possible, use of alternative fuels or electric motors, as widely reported in the ENAC document "Guidelines to minimize fuel use and reduce greenhouse gases" published in 2009.

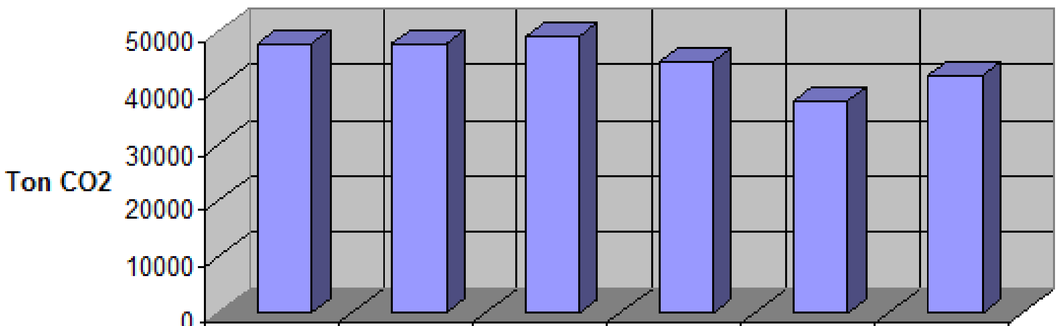
Given that environmental performance of these vehicles can improve up to 90% emissions reduction, ENAC will introduce modernization of the GSEs as a mandatory airport handlers environmental standard.

Data reported in the tables refer to the most commonly used vehicles in airport areas, data on timing and mode of use were provided by handler.

From 2005 to 2010 tons of CO_2 generated from the use of airport vehicles fell from 47,817 to 42.295. The trend in emissions from 2007 to 2009 finds its cause in the economic downturn.

CO_2 emissions from the use of airport vehicles in Italian airports

2005-2010



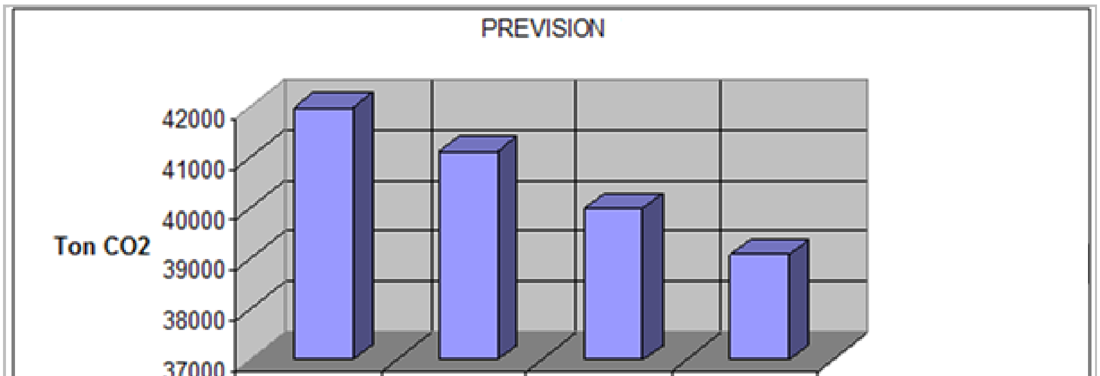
	2005	2006	2007	2008	2009	2010
TOTAL	47817	48000	49295	44717	37696	42295

From 2011 to 2014 ENAC assumes that with an annual replacement of 10% of old vehicles with other more technologically and eco-friendly advanced models, even with a passenger and cargo traffic growth, it is possible a reduction of 2,198 CO_2 tons, that is significant compared to the scope of reference.

This result, estimated at between 7 and 8% per annum compared to the total vehicle fleet can be obtained by optimizing the use of airport vehicles and a renewal with Euro 4 standard motors.

CO2 emissions by the use of airport vehicles in Italian airports

2011 - 2014



	2011	2012	2013	2014
PREVISION	41989	41126	40007	39071

4.6. Aircraft related technology development

IPCC Special Report Aviation and the Global Atmosphere, published in 1999, shows that passenger aircraft currently in service, in terms of emissions, have an efficiency passenger/km improved by 70% compared to aircraft in service 40 years ago and better than 20% over 10 years ago. For the year 2015 is expected to further improvement of 20% and for 2050 of the 40/50%.

Most of these results arise from the increased engine efficiency and for the rest the design of the cell.

Despite the deep economic crisis of the highly industrialized countries, according to estimates of the Current Market Outlook 2010/2029 Boeing demand for new aircraft remains globally good, offering the advantages of improved efficiency and increased capacity.

The placing on the market of new aircraft, the use of technologically advanced components and the use of biofuels are necessary conditions for achieving the expected trend.

In addition, aircraft with more efficient engines represents a good defense against volatility in fuel prices and helps airlines to achieve their environmental objectives, which became in Europe especially stringent because of the enlargement of the Emissions Trading Scheme to civil aviation.
Aircraft technology development is carried out by several international projects: the Italian Alenia Aeronautica is leading a significant project, as set out below.

4.6.1. The Green Regional Aircraft

One of the six Clean Sky platforms, the Green Regional Aircraft (GRA) is led by the Italian Alenia Aeronautica and involves 32 European partners, such as engine manufacturers, system engineering companies, research centres, universities, small and medium enterprises.
The future green regional aircraft will meet demanding weight reduction, energy and aerodynamics efficiency, an high level of operative performance, in order to be compliant regards to pollutant emissions and noise generation levels. To achieve these so challenging results, the aircraft will be entirely revisited in all of its aspects.
The GRA structure is as follows:
GRA1 - Low Weight Configuration (LWC)
GRA2 – Low Noise Configuration (LNC)
GRA3 – All Electric Aircraft (AEA)
GRA4 – Mission & Trajectory Management (MTM)
GRA5 – New Configuration (NC)
and reflects its transversal nature by being organized in 5 domains, that in turn interface with the other JTI platforms, such as Eco-Design (EDA for Airframe with LWC, EDS for System with AEA), System for Green Operation with AEA and MTM, and Sustainable and Green Engine (SAGE) with NC.
The GRA1 Domain will consider all the solutions that may allow for considerable weight reduction, from the improvement of current composite materials with more innovative solutions such as multi-functional Layer and multi-layer architectures that can ensure electric conductivity and lightning resistance and a better acoustic insulation, to the introduction of new lower-density aluminium alloys.
Advanced manufacturing and assembly techniques will also be developed and tested.

The Domain will also review the possibility to use various sensor technologies embedded in the composite to monitor the health status of the structure and report the degradation of its mechanical properties as required.

The GRA2 Domain will evaluate the effects of drag reduction of the aircraft with a view to reducing consumption and external noise. Drag in particular will be reduced, by using Natural Laminar Flow (NLF), that will be integrated with specific innovative anti-ice and high lift systems able to alleviate well-known drawback of NLF technologies. Flow and load control systems activated by electric fly-by-wire commands will be also investigated both for drag and weight reductions. In order to reduce external noise and drag the study will deal mostly with approaching and landing phase, improving high lift device (HLD) technologies. Gears will also require further aerodynamic optimization, with respect to past approaches, in order to reduce the turbulences they generate and consequently reduce noise.

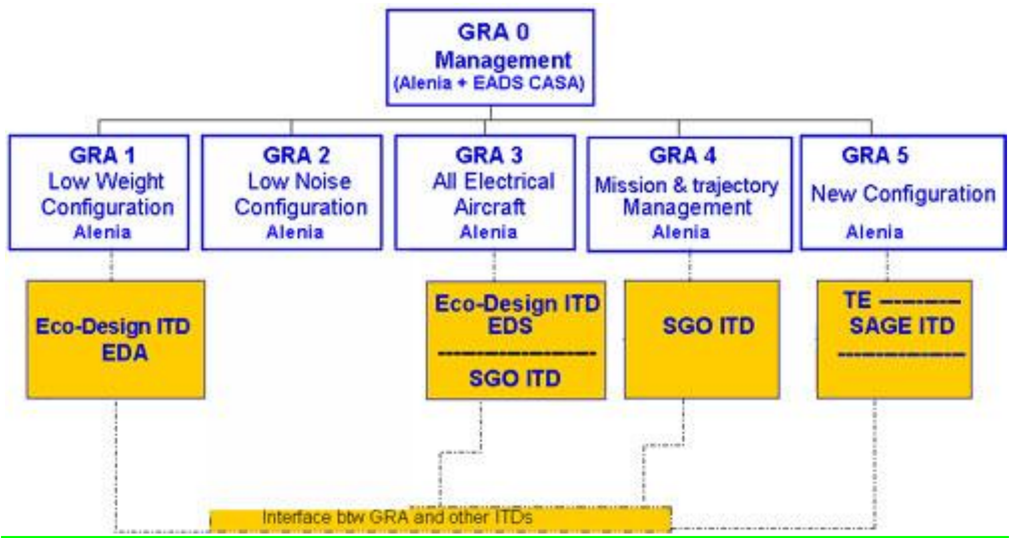
The GRA3 Domain will consider the possibility to remove or minimise the source of pneumatic power (from the engine) and that of hydraulic power, which are both used for ice protection functions, for environment conditioning, cabin pressurisation, flight controls, gears extension and retraction, brakes activation, etc, and replace it with electric compressors, with a consequent greater thrust production efficiency of the main engine. This will be a step towards the so-called All-Electric Aircraft, where all on-board utilities will use only the electric power coming from generators connected to the engine.

The GRA4 domain is in charge of Mission and Trajectory Management (MTM) activities specific for regional aircraft. The activities are performed in tight cooperation with Systems for Green Operations (SGO) ITD – WP3 in particular-, where technological studies are performed.

The main aim is to define optimized trajectories (optimised take-off and landing trajectories, as well as functionalities applicable to cruise phase) able to minimise emissions and the noise impact on the communities surrounding the airports. During these activities SESAR input will be taken into account as soon as available.

The overall idea is that GRA ITD defines regional aircraft requirements and MTM peculiar functionalities. Then, taking into account SGO ITD input, dedicated developments with respect to specific regional applications will performed. These green technologies will be integrated in a flight simulator, which will enable pilots to

fly the new trajectories. The test results will be used to assess the environmental benefits deriving from these new green technologies with respect to the GRA targets.
GRA 5 domain aims at defining advanced regional aircraft general configurations integrating the innovative powerplants (including Open Rotors), Systems and Avionics best fitting the regional aircraft requirements, and the advanced aerodynamics and structures developed in GRA.
Airframe - Powerplant integration studies (innovative tail configurations, rear engine installation, shielding, vibration assessment) will be dealt in. NC is also the domain that will provide the Technology Evaluator with the GRA contribution to the achievements of the environmental impact reduction forecast.



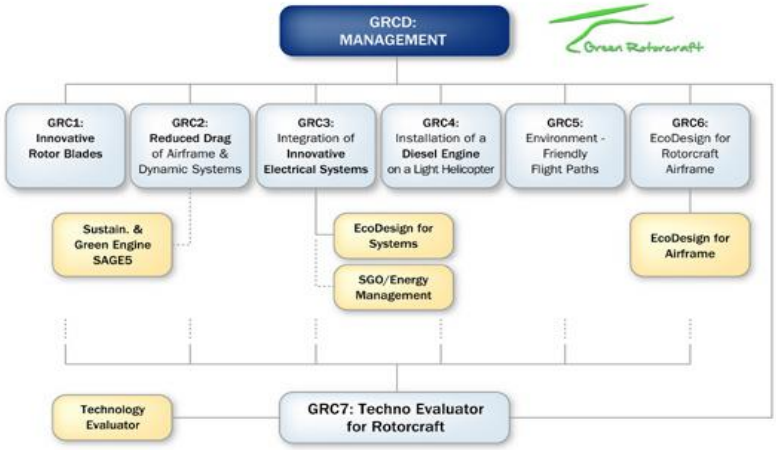
4.6.2. The Green Rotorcraft ITD

The company is a member of the European Clean Sky Joint Technology Initiative, as co-leader of the Green Rotorcraft (GRC) Integrated Technology Demonstration, which is researching external noise reduction technologies, cleaner and more efficient use of power, as well as environmentally friendly flight paths.
Rotorcraft operations are expected to grow sharply in the future being considered a competitive and affordable mode of transportation for point to point connection, compared with road transport and with reduced impact on infrastructures. The future ATS (Air Traffic System) model will include rotorcraft contribution based on both

current and future technologies primarily addressing environmental impact reduction. The GRC main goals are relative to the reduction of perceived noise and pollutant gaseous emissions produced by rotorcraft helicopters and tilt-rotors.

Quantitative targets taking year 2000 as baseline are to:

- Reduce CO2 emissions by 26-40% and NOx emissions by 53-65% per flight,
- Halve the noise impact i.e. reduce footprint area by 50% and the Effective Perceived Noise by 10 dB



Technical approach

<u>External noise reduction</u>

Innovative rotor blades will be developed by using both passive and active control technologies in order to reduce noise and fuel consumption.

<u>Cleaner and more efficient power use</u>

Active and passive methodologies will be used to reduce drag and increase rotorcraft efficiency. Electrical system technologies will be developed to increase systems efficiency and reduce the use of hydraulics (more electric rotorcraft).

<u>Environmentally friendly flight path</u>

Advanced flight procedures will be developed in order to minimise pollutant emissions and noise taking care of air navigation / ATM constraints.

<u>EcoDesign</u>

GRC will participate to research activities in the EcoDesign ITD and peculiar studies will be performed on rotorcraft technologies and component production. Technical Evaluator

Interfacing and direct contribution will be performed to the assessment and evaluation of actual impact of selected technologies for rotorcraft.

The Programme combines seven technology sub-programmes and one management package.

4.7. Alternative fuels

In particular, research on third generation alternative fuels and testing activities suggest that in 2020 at least 20% of fuel used in civil aviation will be replaced by alternative fuels.

ICAO foresees that among alternative fuels, by 2050 biofuels will account for 30% of the consumption of air transport.

Based on the data produced by Boeing Company, biofuel produces approximately 30% of CO_2 emissions compared to jet fuel, with a net emissions reduction equal to 70%. Assuming that the use of biofuels will become relatively cheaper, it could achieve a major reduction in CO_2 production.

Moreover, considering the CO_2 absorbed by plants grown for the production of biofuels, the net balance of CO_2, relative to biofuel used, could tend to zero. For this reason we can easily deduce that this is a market intended for rapid growth and thus the Italian industry in this field is strongly committed to collaborations with foreign partners and to the active support of the Italian civil aviation authority.

On June 8th 2011 ENAC signed with Spanish SENASA and AESA a Research and Test Program on Alternative Fuels for the Civil Aviation, whose purposes and goals are:

- Reduction of technical gap

A undeniable gap currently exists between Europe and USA and (e.g.) Brazil in the field of alternative fuels research and development. This gap emerged during recent 2009 ICAO Workshops (Montreal e Rio), which were a good opportunity to verify the “state of art”, showing clearly the level of progress achieved by these countries. A cooperation in this field is highly recommended, rather than isolated initiatives.

- Technical knowledge

Another area of research consists of the various possibilities of yield improvement in raw materials, always in accordance with the concepts of renewable sources and sustainability productions. A typical example consists of biotechnology researches on biofuels of 3rd generation, that complies with both concepts, and on specific sources (e.g. algae) which permit the best perspectives of high yields.

- Reasons for production and storage

The convenience of the biofuels availability is another area of research that can strongly impact on the development of AF in its future use, due to economic and practical implications. It is known that the today’s use of AF in civil aviation is not economically affordable, due to its very high costs and the unavailability of these fuels, particularly in Europe. Pure research and tests have also shown these problems. The area of research may be identified in the conversion process of raw materials into fuel using more modern, effective and economically feasible system. Transport and storage do not constitute a real problem because existing facilities are made to be used for AF, due to its characteristics of miscibility (drop-in features)

- Environmental protection

The reduction of environmental pollution through the use of biofuels (among the variety of AF) in civil aviation aircraft represent another field of research that can be investigated under several aspects: engine emissions, for which rules exist and are subject to current implementation; local and high atmosphere pollution impact; increase in global warming and CO2 balance (that for biofuels o 3rd generation is notoriously neutral)

- Certification aspects

Another area, characterized also by controversial aspects, consists of the certification that can be provided to AF and to civil aviation aircraft. For this purpose extensive engine/aircraft and laboratories tests are involved in this investigation. Certification criteria and procedures shall be clarified with EASA and FAA.

Research program then will focus on:

- Identification of the AF
- AF specification
- Availability and prices
- Selection of AF blends with TF
- Identification of the aircraft/engines to be tested
- Identification of the aircraft/engine to be tested
- Identification of engine components and powerplant components to be tested (maintenance aspects)
- Testing management
- Data management
- Judgment criteria

Possible partners interested in this Italian-Spanish research program are:

- Aircraft manufacturers
- AF producers
- Universities
- Research institutes
- Engine test rigs
- EASA
- NAA
- FUEL/Oil analysis laboratories

However, it is not possible to think to use biofuel in a significant extent in the short term. This is a typical medium/long-term strategy linked to a generalized use of biofuel by air carriers, that means, the effort of a single airline does not suffice: only a high fuel demand can justify the necessary investiment needed for a radical reorganization of the supply sources and services.

A plan to update the entire fleet of an air carrier needs complex financial and organizational programs. So considerable investments must take into account the air transport demand in a market based on free competition. Therefore emissions reduction due to more efficient aircraft can be assessed and measured in medium and long term.

4.8 Air Traffic Management

ENAV is the Company to which the Italian State delegates the management and control of civil air traffic in Italy.

Entirely controlled by the Ministry of Economy and Finance and supervised by ENAC, ENAV S.p.A. is a result of the transformation of the National Agency for Flight Assistance into a joint-stock Company which occurred in 2000, after its previous transformation into a State-Controlled Enterprise in 1996.

The organisational structure has its legal headquarters in Rome and operating facilities throughout the national territory. ENAV is a member of the international ATM (Air Traffic Management) system and therefore participates in research and development activities in coordination with the international control bodies, such as ICAO, EUROCONTROL, and, for the trade, CANSO.

ENAV's primary task is to contribute to the efficiency of the national transport system, guaranteeing the safety and regularity of circulation within the Italian air space to all categories of users, respecting the international obligations.

The company provides directly to the delivery of the management and air traffic control services assuring the maximum technical and system standards in flight safety.

In order to continue guaranteeing flight security for millions of people and a key role in European air transport to Italy, ENAV has to pay constant attention to its medium and long term strategy choices.

These choices must take the context in which ENAV operates into consideration, which is comprised of and controlled by bodies and institutions relevant to the sector (ICAO, Eurocontrol) and regulated by European laws that have designed a strategy for the international ATM system. These organizations determine regulations and establish requisites along with clear quality and security standards for air

transporters. They are also committed to incrementing interoperability between providers in every country.
ENAV faces all these challenges by defining development projects that set out important and complex investment plans, designed to reach as many technical-functional objectives as financial.

4.8.1. ENAV's FEP

Since 2009, in accordance with the international guidelines, ENAV's Flight Efficiency Plan has been published with the aim to contribute to lower operating costs and environmental impact for airspace users and to deliver in the Italian airspace an air navigation system at the leading edge.
Thanks to the FEP, 18 million kilometers and 98 million kilograms of fuel were saved in Italian skies between 2008 and 2011, allowing aircrafts to release 310 million kilograms of CO_2 less, corresponding to a decrease in fuel consumption worth 60 million Euros.

The FEP proposes measures that promote safety and are compliant with capacity requirements. The proposed measures concern the optimization of the airway system, through the accessibility and planning of new routes, the shortening of routes that already exist and the reduction of restrictions on the availability of airways. The FEP also contemplates the re-design of portions of airspace along with the planning of new operational procedures to enable a more efficient use of the terminal areas in Milan and Rome, using P-RNAV routes (Precision Area Navigation) and Continuous Descent Operations.

The Airport Collaborative Decision Making for major airports, starting from Fiumicino, Malpensa, Linate and Venice, along with the implementation of relevant operational procedures, may contribute in further reducing taxi time. The FEP is accomplished thanks to the fundamental role of operational personnel which is directly involved in pursuing the objective of flight efficiency. In about four years the FEP actions have led up to cumulative savings of miles and time. Despite the air traffic figure swinging trend between 2008 and 2011 has affected the performance achieved year by year, the outcomes delivered through the

FEP actions proved to be better than expected although distributed differently compared to the forecast.

Moreover, ENAV has put in place structured initiatives with the users channeled through the Customer Care activity for cooperation and sharing of operational suggestions. The information exchange with the users through regular meetings with Airlines and their follow-up gave an important feedback over the preparation of ENAV's annual FEP.

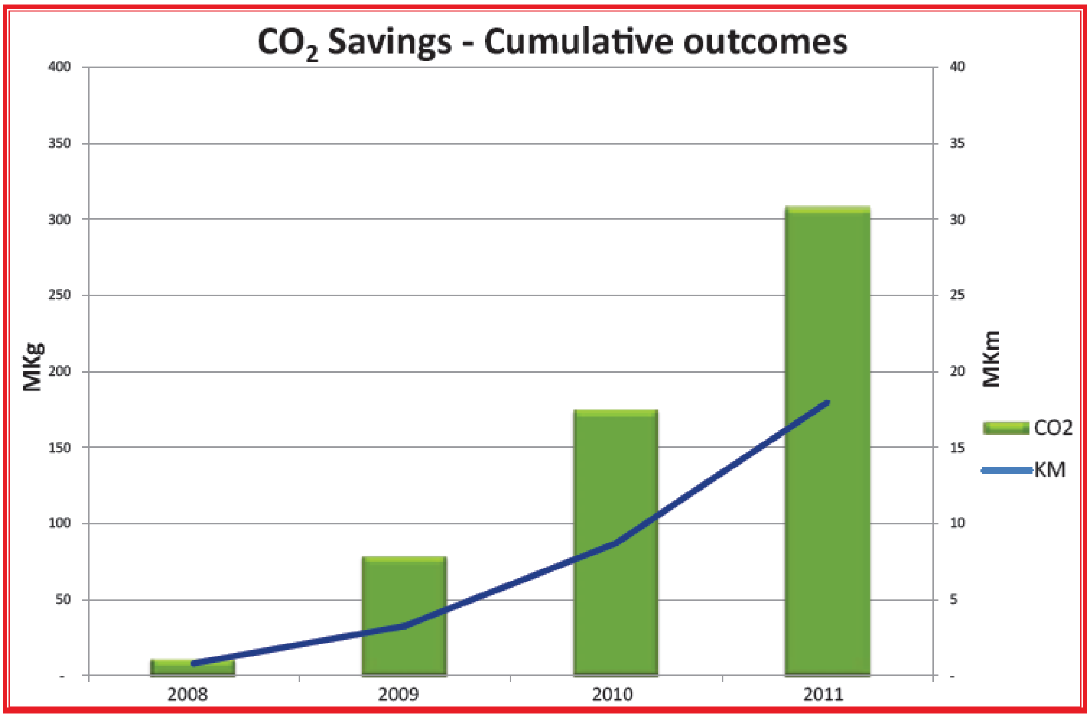
The fourth edition of ENAV’s Flight Efficiency Plan is strictly linked to the Performance Based Navigation Plan prepared in 2011. The implementation of the PBN plan in Italy will bring improvements to the ATS route network and should grant benefits over the global efficiency of ATM.

The guiding principles for the FEP detailed actions planned by 2014 are:

- reorganisation of route network portions /Streamlining of routes
- reduction of hourly applicability of route availability (RAD) restrictions.
- improvements in flight profile for some selected city pairs,
- further network optimization on the basis of traffic demand, including free route during night time,
- implementations of P-RNAV SIDs and STARs, including CDO information where feasible,
- implementation of A-CDM with SW support for automatic data exchanging among ATC, AOP, Airlines, and related operational procedures,

FEP Outcomes 2008-2011

ENAV has a Flight Efficiency Plan since the beginning of 2009. During about three and a half years the implementation of efficiency measures allowed considerable savings in terms of fuel consumption and GHG emissions. The measures – almost all structural improvements – have been progressively created since 2008 thus producing their effects year after year for about 310.000T (cumulative) of CO_2 savings.



Here under are the savings that followed the FEP 2011 implementations:

	FEP 2011 Targets	FEP 2011 Outcomes
Km	1.340.000	1.025.000
Kg Fuel	9.400.000	11.025.000
Kg CO_2	29.610.250	34.728.000

The reduction of kilometres is lower than expected since the Italian airspace has undergone a reduction in traffic due to the 2011 war in North Africa. In spite of this, the estimate of fuel reduction has proved beyond expectations thanks to the raising of the plannable flight levels on some rather busy city-pairs.

En-route airspace design and network availability

Since 2008, the Italian airspace has been undergone a number of reorganizations and rationalizations of its route system. Hand in hand, the Route Availability Document (RAD) and Profile Tuning Restrictions (PTRs) , have been updated on a regular basis with the aim both to optimize the network and to better balance capacity and efficiency.

In 2011, experimental solutions have been developed and then tested before their permanent implementation in order to facilitate the reduction of operational restrictions on the network.

In order to present the results achieved and the interventions planned for the en-route portion of flight, the action points 1 and 2 of the previous editions have been merged into a single paragraph to reflect the built-in relation between the airspace structure and its use.

The main actions addressed are summarizes hereinafter.

2008 - 2011 achieved

2008/2010

• Implementation of new routes, extensions, realignments: 34 implementations
• Reorganization of route network portion over ALG area and Verona area
• Raising 2000ft of level capping for city-pairs:

√ LIM* to LIEA/EO
√ LIM* to LIRN
√ LIML to LIRF
√ LIRF to LIML
√ LIP* to LIR*, to LIM*, to LS*(except LSZA)& LFL*;
√ LIR* to LIM*, to LIP*
√ LS*(except LSZA)& LFL* to LIP*
√ LIRN to LIM*
√ LIM* to LIEE/ED/ET

• User preferred flight level for bidirectional domestic city-pairs (Removal of Level Capping):
√ LIB* to/fm LIP*; LIB* to/fm LIE* and LIM* to/fm LIB*

• Implementation of dedicated direct routings, night-time (2200-0400 UTC) or H24 availability:

√ 51 DCTs

2011

• Doubling ATS route L5/UL5
• Realignment of ATS route N/UN737
• Implementation of ATS route UQ58 segment to serve LICC/LICZ
• Network optimization on the basis of traffic demand
• Conversion of 19 DCT into direct routes and time extension of their availability
• Raising 2000ft of Level Capping for bidirectional domestic city-pairs:

√ LIB* to/fm LIC (except LICG/LICD)*, to/fm LIR*, to/fm LIBP
√ LIE*to/fm LIC (except LICG/LICD)*;
√ LIR*(except LIRQ/RP)to/fm LIC (except LICG/LICD)

• User preferred flight level for domestic city-pairs (Removal of Level Capping):

√ LIRN to LIMC/MF

• Raising further 2000ft of level capping for city-pair LIRF to LIML via UQ704/UQ703

• Reduction of three hours of route availability restrictions in winter

√ Zagreb ACC to LIRA/LIRF/LIRN

All of the abovementioned solutions have been implemented over the past years to improve the flight planning of routes also in accordance to the airspace users' expectations. In particular, some early implementations raised the estimate of fuel and CO2 savings compared to the foreseen ones. Moreover it is estimated that the cumulative 2008-2011 fuel savings are close to 53.000 tons.

2012/2014 planned

ENAV's PBN Plan for Italy will bring improvements to the Route system with the enforcement of new route segments based on RNAV capability. These interventions will also facilitate the application of CDO/CCO as well as match the needs of TMA development. The foreseen simplifications and rationalizations are shown hereunder and are mostly also included in the Blue Med FAB framework.

Design and use of terminal areas

In the terminal areas the optimization of the air traffic management and the reduction of flight distance and time are reached through a rational and efficient use of airspace by means of introduction and/or modification of the new SIDs/STARs and of the reorganization of the CTRs.

In 2011 the Precision Area NAVigation was introduced in the Italian airspace and an ad hoc AIC was published resulting in the enforcement of the first SID/STAR PRNAV procedures.

Whenever feasible, the new approach procedures are designed with the aim to reduce miles and in line with the Continuous Descent Operations concept. CDOs procedures will be gradually phased in being performed in the first implementation stage only during the night.

The charts below report the main projects planned up to 2014 willing to improve flight efficiency in the terminal areas.

2012

Implementations of P-RNAV SIDs/STARs in:

• Bergamo

• Bologna

• Olbia

• Venezia

• Verona

2012

Continuous Descent Operations

• Publication of an ad hoc AIC

• Dedicated procedures for Milano Linate

2012/2013

Implementations of P-RNAV SIDs/STARs in:

• Roma TMA

• Milano TMA

Airport operations

The Airport Collaborative Decision Making (A-CDM) is the key activity to improve the airport operations efficiency allowing to optimize the departure sequence times and taxi times (-in and -out).

In the major airports managed by ENAV a system of automatic data exchange is already available and it represents an enabling factor for the reduction of apron and taxiway congestion- especially during air traffic peak hours - still guaranteeing the traffic flows and the AOs' needs.

ENAV's goal is to contribute to the reduction of an average of one minute taxi time per movement, calculated on all the movements starting from 2008 up to 2011.

The complexity of monitoring taxi time reductions for all the airports run by ENAV led to focus on 9 airports in 2008/9, on 11 airports in 2010 and on 14 in 2011. Monitoring is going onto progressively include other airports.

Taxi-out time savings for the 14 airports considered, 2011 compared to 2010, have recorded an average of about 8 seconds per movement. Since 2008 the sole taxi time saving can be estimated in 757.000 minutes.

With reference to the initial 9 airports, where the monitoring started in 2008, the performance is still improved in 2011 compared to 2010. In these airports the average reduction is increased from 31 to 48 seconds on the 2008 baseline.

Operational staff awareness

One of the five cornerstones of ENAV’s FEP is to raise air traffic controllers’ awareness since they can give a mighty contribution for fuel savings both to flight and ground operation.

The principle of flight efficiency and their environmental implications were planned to be part of all trainings and updating for ATCOs ever since ENAV’s first FEP in 2009. Currently they are included in both the training plans and report cards of ab-initio and advanced courses of the ATCOs students of ENAV’s Academy as well as in the ATCOs continuation training courses.

4.9. Operators actions and fleets renewal

The constant pursuit of efficiency in fuel consumption is a key strategy of all airline companies, including the Italian ones.

The major initiatives for the reduction of fuel consumption are developed and implemented primarily in the following areas:

- Flight Dispatch: continuous improvement of the process of the optimization of operated routes, in conjunction with ENAV and the other international actors, pursuing an ever greater attention to the definition of efficient routes in terms of duration, distance and flight levels, in order to reach the definition of optimal flight profiles;

- Flight Operations: introduction in both planning and management of new flight procedures and definition of the amount of fuel per flight through information systems, which provide for more precise planning data, and new techniques and procedures to follow in the execution of the different phases of flight (including on ground, taxi out, taxi in),

- Ground Operations: improvement of the performance of the aircrafts and consequent optimization in fuel consumption with the introduction of weight reduction measures, especially weight related to the provision of on board services, in order to load drinking water on board in a efficient way, and with new procedures for the minimization of the use of APU,

- Maintenance and Operational Control: activities of optimization of the average time of those anomalies, which do not interfere with flight safety, but have an impact on fuel consumption, through the monitoring of the frequency of engine cleaning on annual basis

4.10. ALITALIA

Alitalia is the first Italian airline with flights to 95 destinations in Italy and in the world (summer season 2012), with 25 million transported passenger. The airline operates 4,500 flights weekly with a fleet of 149 aircraft.

The Alitalia network is centered on 7 operational bases: Rome Fiumicino, Milan Linate, Milan Malpensa, Turin, Venice, Naples and Catania. Alitalia is member of the SkyTeam alliance and of the main transatlantic joint venture in air transport together with Air France-KLM Group and Delta Air Lines.

The continuous research for a fuel consumption efficiency is one of the key points of Alitalia's strategy, together with the reduction of the environmental impact to air transportation.

Alitalia signed an OnPoint Fuel & Carbon Solutions agreement with GE Aviation. GE Aviation, an operating unit of GE (NYSE: GE), is a world-leading provider of jet and turboprop engines, components and integrated systems for commercial, military, business and general aviation aircraft.

Through specific software and fuel-consulting expertise, GE's Fuel & Carbon Solutions will work with Alitalia to identify and track operational improvements that could reduce the airline's fuel consumption by an average of three percent on given segments, which will help to reduce its emissions and significantly cut operational costs.

The process is divided into three steps, described as follows:

1. Operational evaluation: identify and collect data on the airline's current fuel and carbon reduction programs

2. Customized solution design: Further analyze data to isolate and prioritize potential improvements;

3. Implementation support and verification: Work with customers to implement changes, and then measure and validate savings.

From 2009 to present Alitalia has replaced 65 MD80 aircraft type with aircraft A320, and the phase-out is expected to be completed within the current year. The fleet will be completed with aircraft for medium-haul flights, which are more efficient in fuel consumption.

The reduction of fuel consumption can be estimated around 17% compared to consumption of MD80 aircraft. In absolute terms Alitalia saves annual CO2 emissions equivalent to 176,343 tons per aircraft.

After the phase out of old Boeings 737, and with the entry into fleet of 4 new Embraer, the Alitalia fleet consists of aircrafts with an average age of 8.8 years, lower than that of major competitors.

Thanks to all the actions carried out and the strategy adopted for fuel efficiency, compared to 2010 in 2011, Alitalia saved 11 million liters of fuel with a reduction in CO2 emissions equivalent to 30,000 tons.

Furthermore on April 2012, Alitalia and WheelTug signed a partnership in order to introduce an innovative electric drive system for taxiing the Airbus A320 family of aircraft.

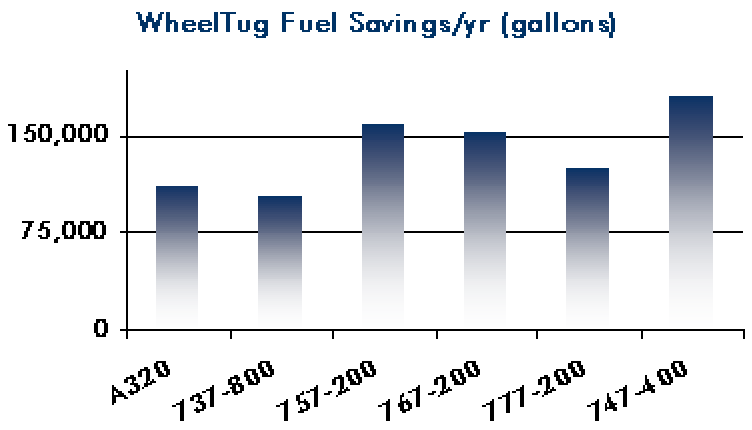
The patented WheelTug electric drive system consists of an electric motor - called "Chorus" - installed in the aircraft nose wheels and powered by the APU (Auxiliary Power Unit), the auxiliary engine installed in the tail of aircraft which provides energy to the on-board systems when the main engines are off.

The equipment allows aircrafts to taxi both forwards - without the use of main engines - and backwards - without the use of a tow tug. The Chorus electric motor permits the aircrafts to move from the departure gate to the runway, and upon landing, from runway exit to the stand for passenger disembarkation.

This new technology, which is without precedent in commercial aviation, allows up to an 80% reduction in the fuel consumption for aircraft ground movements, with a significant reduction in cost, noise, and environmental impact.

When aircraft taxi using their engines, they consume significant amounts of fuel. A typical 737 will consume between 17 and 25 pounds/minute while idling. WheelTug, by requiring only APU power for taxiing purposes, can cut that fuel cost substantially. With a typical 737, fuel savings of between 13 and 21 pounds/minute of taxi time can be expected.

This not only saves fuel, it can cut the amount of fuel required for unexpected ground delays.



On typical short to medium-haul routes, these aircraft spend a significant percentage of their time on the ground, so fuel savings can really add up.

The use of Chorus electric motor also makes the aircraft independent from the tractor for push back, helping to increase operational flexibility and improving on-time operations.

Thanks to this partnership the Alitalia becomes the first airline using this innovative technology: 100 WheelTug systems have been reserved for its A320 aircrafts.

CONCLUSION

The actions of Italy, just as described in this document, are numerous: they touch all aspects related to the operation of air transport passengers from their airport entrance to their arrival destination. These actions generate an increasing reduction of aviation emissions.

Italy accepts and promotes initiatives to reduce emissions of carbon dioxide agreed at internationally and EU level.

In the long term by 2050 it is expected an improvement of at least 40% in terms of emissions efficiency referred to passenger / kilometer, resulting from a higher efficiency of engines and to the new cell design.

By 2050, moreover, civil aviation will consume biofuels for 30%: this 30% will produce 70% less emissions. Even higher emissions savings could be realized if the technological evolution the use of biofuels will become economically more convenient, with consolidated production and distribution processes.

Technological developments will also be essential for the air traffic management systems and communication, navigation and surveillance technologies.

Much is expected from the Clean Sky Program, SESAR and the creation of FABs .

By 2020, from innovations related to air traffic management, a further reduction of 10% of the total emissions produced by the air transport system is expected. In the same timeframe, in addition, further efficiencies could be obtained with the implementation of the Blue Med FAB and through the collaboration and cooperation among the Air Navigation Services Providers appointed in Italy, Greece, Malta and Cyprus.

According to ENAC, compared to 2010, by 2020 Italy could aspire to a total emissions reduction close to 5%, given that savings realized with the contribution of the operating area (ATM and fleets renewal) will add up the savings realized with interventions on airport infrastructures and modernization of airport ground support equipments.

In order to achieve these environmental targets, a proper cooperation among all relevant stakeholders and a serious commitment in the respective field of action is needed.

The success of emissions reduction activities heavily depends on events that are independent from all intents, as the crisis in the air transport sector, due to the ongoing international financial crisis and this implies that a high degree of uncertainty is inherent in the achievement of proposed emission reductions.