ANA, Thinking of People and Earth

Environmental Report

2003

ALL NIPPON AIRWAYS CO ., Ltd
ANA Group

September 2003

ANA Group Corporate Philosophy

Our Commitment

On a foundation of security and reliability, the ANA Group will :

Create attractive surroundings for customers
Continue to be familiar presence
Offer dreams and experiences to people around the world

(Settled in Apr. 2002)

ANA Environmental Policy

ANA's Attitude toward the Environment

Basic Policy

We will pursue :

- Protection of the environment
- Effective utilization of limited natural resource
- Awareness of the public good

Course of Action

1. We will evaluate the impact of our commercial activities on the environment, and persevere in our efforts to protect the environment.
2. We will observe environmental laws and regulations, and furthermore, think and act independently to protect the environment.
3. We will make our best endeavor to minimize the environmental impact arising from operations of the airline industry.
4. We will make every effort to save energy and resources, to recycle articles, and to reduce waste.
5. We will contribute to the communities in which we live and work, through participation in social activities on environmental protection.
6. We will educate employees so that each may pay much more attention to environmental protection.

Environment Committee

This ANA Environmental Policy is declared inside and outside company

(Settled in May. 1998)

Introduction

The ANA Group appreciates your continued patronage.

In the 21st Century Global environmental issues need to be addressed not only at the national and civil society levels, but also at the corporate level. With a growing awareness of these issues, customers, investors, and employees have started selecting companies based on their "environmental management." In other words, such issues as corporate management's attitude its incorporation of environmental considerations, as well as the way it deals with societal harmony have become a barometer for measuring the quality of corporate governance.

The ANA Group has long considered environmental issues to be one of the most important aspects of company management, and has actively addressed these issues throughout its history. Today, we have adopted a new environmental action plan called the "ANA Group Ecology Plan" for 2003 to 2007. In this plan, ANA has renewed its determination to address environmental issues with the joint efforts of the group by incorporating customer opinions into our environmental management, and further reducing CO_2 emissions from aircraft operations in order to further realize the ANA Group's action course of "moving forward with society."

In the introduction of new aircraft, ANA has put forward a plan to standardize its fleet with the newest and most advanced aircrafts with low noise and high fuel efficiency, and in regards to this, we have recently announced a plan to introduce the new generation of B737NG(New Generations) jets into our small jet fleet. We intend to continue serving our customers through the effective consumption of limited fossil fuel resources.

Through this report, we hope you will understand how the ANA Group addresses global environmental issues. We appreciate your opinions and suggestions on this matter.

September 2003

All Nippon Airways Co., Ltd.
President and CEO

Yoji Ohashi

All Nippon Airways Co., Ltd.
Senior Vice President
Environmental Committee Chairman

Hitoshi Nakajima

Contents

Unless noted otherwise, this environmental report describes the environmental situation of ANA (except some overseas offices) and the following ANA Group companies as of fiscal year 2002 (1 April 2002 – 31 March 2003).

Group companies / Items	Air transport						Ground services				Aircraft maintenance									GSE Maintenance			Other businesses		
	All Nippon Airways (ANA)	Air Nippon (ANK)	Air Nippon Network (A-net)	Air Hokkaido (ADK)	Air Japan (AJX)	Nippon Cargo Airlines (NCA)	International Airport Utility	Osaka Airport Service	New Kansai Int'l Airport Services	ANA Aircraft Maintenance	ANA Aircraft Technics	ANA Techno Aviation	Tokyo Aviation Service	ANA Nagasaki Engineering	ANA Aero Supply Systems	ANA Engine Services	ANA Aero Tech	ANA Avionics	ANA Motor Service	Osaka Airport Motor Service	Narita Engineering Service	Saywa Service .	ANA Hotels	ANA Trading
Aircraft operation results	F	F	F	F	F																				
Fleet (operation equipment)	F	F	F	F	F	F																			
Environmental compliance program	F									F	F	F	F	F	F	F	F	F							
Environmental accounting	F	P			P																				
Global warming	F	P			P																				
Air pollution	F	P	P		P	P				P		P							P	P	P				
Noise	F	P			P	P																			
Emissions, waste and recycling	F	P								P		P		P											
Environmental conservation activities of group companies										F		F							F				F	F	
Environmental data collection	F	F	F	F	F	-	F	F	F	F	F	F	F	F	F	F	F	F	F	F	-	F	-	-	

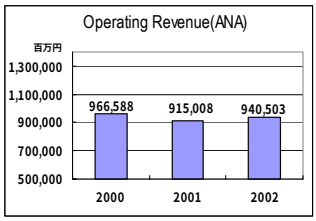
Report coverage: F= Full, P=Partial

Outline of ANA

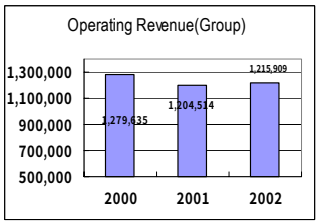
Company Name	ALL NIPPON AIRWAYS Co., Ltd. (Airline Code : ANA, NH)
Foundation	Dec. 1952
Head Office	Shiodome City Center, 1-5-2, Higashi-Shimbashi, Minato-ku, Tokyo
President & CEO	Yoji Ohashi
Paid-in Capital	JPY 86,239million
No. of Employees	12,772(Non-consolidated) employees
Operation Revenues	JPY940,503million
Core Business	Scheduled air transport service
The ANA Group	No. of subsidiaries : 143, No. of affiliates : 41

Operating Revenues

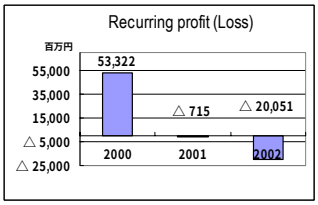
ANA

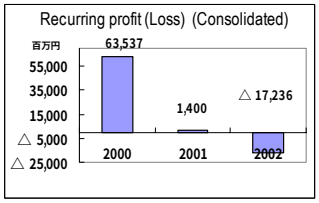


ANA Group

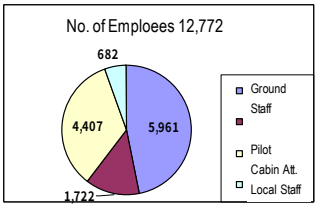


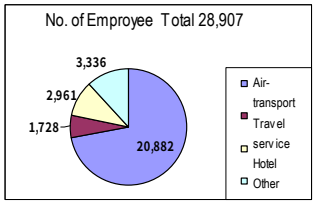
Recurring profit





Employees





ANA's principal group companies

Airtransport
- Air Nippon Co., Ltd.(ANK)
- Air Japan Co.,Ltd(AJX)
- Air Nippon Network Co.,Ltd.(Anet)
- Air Hokkaido Co.,Ltd.(ADK)
- Nippon Cargo Airlines Co.,Ltd(NCA)

(Flight Support)
- ANA Aircraft Maintenance Co., Ltd
- ANA Skypal Co.,Ltd
- International Airport Utility Co.,Ltd.
- New Tokyo Int'l Airport Service Co.,Ltd.
- ANA Catering Service Co.,Ltd.
- ANA Telemart Co., Ltd.

Travel Services
- ANA Sales & Toures Co.,Ltd.
- ANA World Tours Co.,Ltd
- ANA Travel Co.,Ltd
- ANA Sky Holiday Tours Co.,Ltd

Hotel Operations
- ANA Hotels Co., Ltd.
- ANA Hotel Tokyo Co.,Ltd.
- ANA Hotel Sapporo Co.,Ltd.
- Okinawa ANA Resort Co.,Ltd.

Other Businesses
- ANA Information Sys. Planning Co.,Ltd.
- Infini Travel Information, Inc.
- ANA Logistic Service Co.,Ltd.
- ANA Trading Co.,Ltd.
- ANA Real Estate Co.,Ltd.
- Saywa Service Co.,Ltd.
- Jamco Corporation

City / Airport served by ANA Group (as of Mar.2003)

All Nippon Airways(ANA)

Wakkanai	WKJ	Washington D.C.	IAD
Memannbetsu	MMB	New York	JFK
Kushiro	KUH	Los Angeles	LAX
Asahikawa	AKJ	San Francisco	SFO
Sapporo	CTS	London	LHR
(Chitose)		Paris	CDG
Hakodate	HKD	Frankfurt	FRA
Aomori	AOJ	Beijing	PEK
Akita	AXT	Tenjin	TSN
Sendai	SDJ	Dalian	DLC
Shonai	SYO	Shenyang	SHE
Niigata	KIJ	Xiamen	XMN
Narita	NRT	Qingdao	TAO
Tokyo	HND	Shanghai	PVG
(Haneda)		Hong Kong	HKG
Toyama	TOY	Singapore	SIN
Komatsu	KMQ	Bangkok	BKK
Nagoya	NGO	Ho Chi Minh City	SGN
Kansai	KIX		
Osaka	ITM		
(Itami)		**Air Nippon(ANK)**	
Tottori	TTJ	Taipei	TPE
Yonago	YGJ		
Okayama	OKJ	**Air Japan(AJX)**	
Hiroshima	HIJ	Honolulu	HNL
Yanaguchi-ube	UBJ	Guam	GUM
Tokushima	TKS	Seoul	ICN
Takamatsu	TAK		
Kochi	KCZ		
Matsuyama	MYJ		
Fukuoka	FUK		
Saga	HSG		
Nagasaki	NGS		
Kumamoto	KMJ		
Oita	OIT		
Miyazaki	KMI		
Kagoshima	KOJ		
Okinawa	OKA		

Air Nippon(ANK)

Rishiri	RIS
Monbetsu	MBE
Nakashibetsu	SHB
Sapporo	OKD
(Okadama)	
Odate-Noshiro	ONJ
Fukushima	FKS
(Noto **	NTQ)
Oshima	OIM
Hachijojima	HAC
Iwami	IWJ
Tsushima	TSJ
Fukue	FUJ
Miyakojima	MMY
Ishigakijima	ISG

Air Nippon Network (A-net)

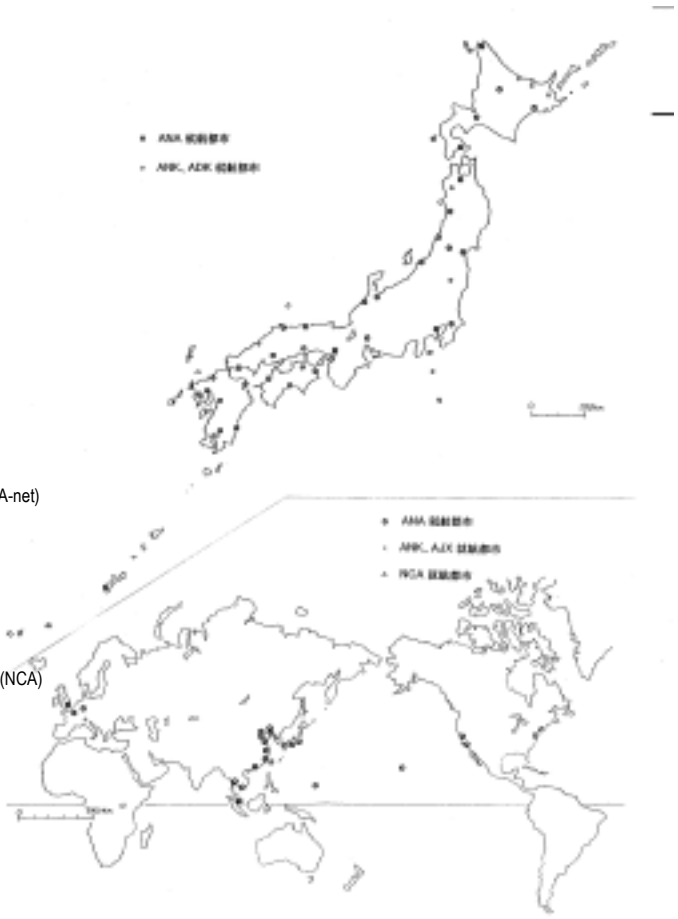
Miyakejima	MYE

Air Hokkaido(ADK)

Okushiri	OIR

Nippon Cargo Airlines(N (NCA)

Anchorage	ANC
Chicogo	ORD
Indianapolis	IND
Amsterdam	AMS
Milan	MXP
Mnila	MNL
Kuala Lumpur	KUL



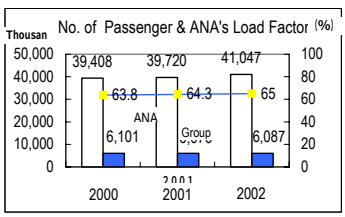
(Noto**) Airport opened Jul. 2003 and fly by ANK

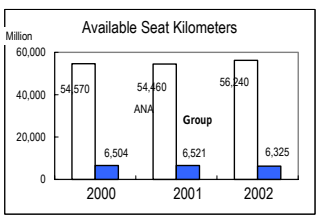
Aomori, Tokushima, Asahikawa : Not fly as of Aug. 2003

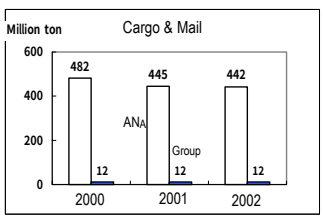
Flight Operation (2002 Fiscal)

	Domestic	International	Total	
No. of Flight ANA	200,642	22,358	223,000	
Total ANA Group	290,464	24,421	314,885	
Flight Length ANA	174,183	99,097	273,280	(1000 km)
Total ANA Group	225,079	102,791	327,870	(1000 km)
Flight Hour ANA	290,722	113,465	404,187	(Hr)
Total ANA Group	386,803	118,248	505,051	(Hr)

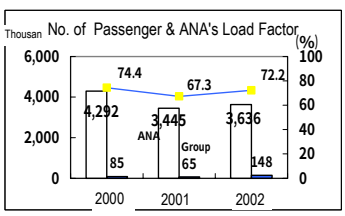
Domestic Service

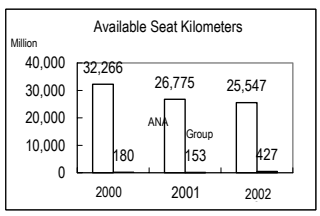


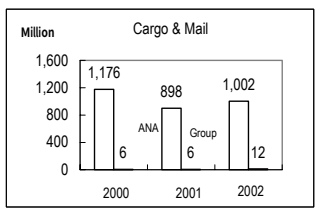




International Service







(Except Charter Flight)

Group = Domestic: ANK, ADK, Anet

International : ANK, AJX + Code-Share Flight

ANA fleet

(As of Mar. 2003)

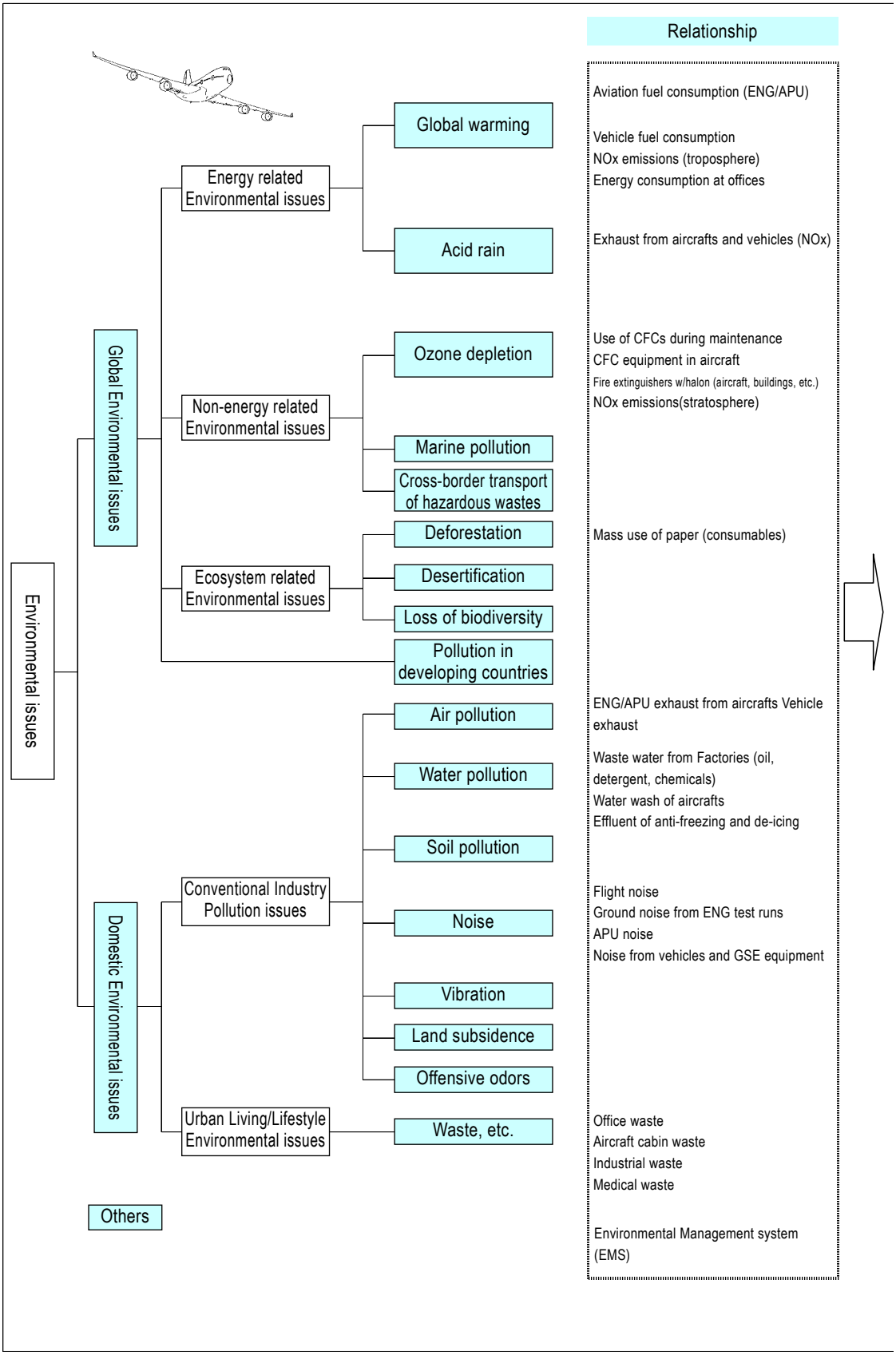
Aircraft Type No. of seats)	No. (Change)	Engin Type	Ave. Age	ICAO Noise Standard conformity to Chapter 3/4 **
A320 (166)	25 (±0) *Include ANK	CFM 56-5A1	10.0	Ch-3/4
A321 (195)	7 (±0)	V2530-A5	4.0	Ch-3/4
B767-200 (234)	9 (-5) * Include ANK	CF 6-70A	17.1	Ch-3/4
B767-300 (216-288)	49 (+7) * Include Air Japan (AJX) and ANK	CF6-80C2 B-2 /B6/B6F	10.0	Ch-3/4
B777-200 (234-382)	16 (±0)	PW 4074/4077 /4090	5.4	Ch-3/4
B777-300 (477-525)	5 (±0)	PW4090	4.8	Ch-3/4
B747-200B (310~377)	2(±0)	CF6-50E2	16.8	Ch-3
B747SR (536)	8(-1)	CF6-45A2	21.9	Ch-3
B747-400 (320-569)	23 (±0)	CF6-80C2B1F	9.3	Ch-3/4
Total	139 (+1)		10.7 (+1.0 : diff. with the previous year)	

Group airlines Fleets

Aircraft Type (No. of seats)	No. (Change) Operating Airline	Engin Type	Ave. Age	ICAO Noise Standard conformity to Chapter 3/4 **
DHC-6-200 (19)	2 (±0) Air Hokkaido (ADK)	PT 6-27	30.9	—
DHC-8-300 (56)	4 (+2) Air Nippon Network(Anet)	PW-123B	1.3	—
YS-11 (64)	3 (-3) Air Nippon (ANK)	Dart Mk543-10K	33.1	—
B737-500 (126-133)	25 (+2) Air Nippon (ANK)	CFM 56-3C1	6.9	Ch-3/4
B737-400 (168-170)	2 (±0) Air Nippon (ANK)	CFM 56-3C1	9.7	Ch-3/4
B747 F/SRF (Cargo capacity 758m³)	11 (±0) Nippon Cargo Airlines (NCA)	CF 6-50E2	16.5	Ch-3

**** ICAO Chapter 4 - New standard for after 2006 newly type certification (Ref. P.37)**

How airlines are related to the environment



Aug. 2003

Laws and regulations	Current status and future tasks of ANA
UN Framework Convention on Climate Change (Kyoto Protocol) (Law to promote measures to counter global warming)	CO_2 emissions from aircrafts 7.18 MM ton (1.96 MM t-C) Aviation fuel consumption 2.91 MM kl Per ASK 24.6 g-C (ANA's Target: -12% 23.9 g-C)
Federation of Economic Organization's (Keidanren) Voluntary Action Plan for Airlines (By 2010, target 10% CO_2 emission reduction per available seat kilometer (ASK) from 1990 levels)	APU use reduction (use ground facility) Class 2 designated energy management facility (6.0 MM KWh, 1500 kl) Business C, Crew Training C, Aircraft Maintenance C (West), Test Cell (Aircraft MC (North), Narita MC, Chitose Airport Branch) : power saving
Introduction of an "environmental tax" (carbon tax)?	
Reinforcement of the "Law Concerning the Rational Use of Energy"*	
"Air Pollution Control Law"	Group companies: Use of low pollution cars: 141approx. 2000 vehicles -> Increase
"Automobile NOx and SPM Law,"* green tax Ordinances of Tokyo Metropolitan Government and Chiba Prefectural Government for the "Regulation of automobile exhausts and operation"*	
"Vienna Convention," "Montreal Protocol" (Law Concerning the Protection of the Ozone Layer) "Fluorocarbon Recovery and Elimination Law" (Banning the production of CFCs and halons, and production ban on CFC alternatives by 2020) "Fire Law"	Total elimination of CFC use in maintenance works (1994) Stop using CFC equipment, use of CFC alternatives, measures to prevent leakage of CFC alternatives, CFC waste treatment Dumping fuels in emergency landing
"Basic Law for promoting the formation of a recycling-oriented society" "Law on Promoting Green Purchasing"	Promote recycled paper use, expand green purchasing of office supplies, sort papers for collection, and recycle papers
"Washington Convention"	Provide guidance on the carry-on restriction for import-banned animals and plants
ICAO Aircraft Emission Regulation (Civil Aeronautics Law/Airworthiness Certificate) "Air Pollution Control Law"*	All ANA aircrafts complied with ICAO emission standards Full use of flight simulators for pilot training and examination Promote vehicle exhaust gas (NOx, SPM) control measures in airports Total compliance with the stoppage of vehicle idling Use low VOC paints, review paint removers
""Water Pollution Control Law"* "Sewage Law"* "Natural Environment Conservation Law"	Full waste water treatment facilities, study the reuse of waste water, finished switching from ethylene glycol to low pollution propylene glycol for de-icing
"Law on Soil Pollution Measures"	
ICAO noise regulation*, "Civil Aeronautics Law / Aerialness Certificate" (Airport Management Regulations, guide for curfew, etc.) "Environmental standards for aircraft noise" "Labor Safety and Sanitation Law"* "Noise Control Law," "Vibration Control Law"	All ANA aircraft fleet complied with ICAO Noise Control Chapter 3 Measures to comply with new ICAO Noise Control Chapter 4 Compliance and study of noise abatement operation procedures Nighttime T/R restraint, self-restraint of ENG test run Facilities for test run (NRT, HND, OSA, and KIX) Change to low noise GSE
"Waste Treatment and Cleaning Law (General, Industrial, Medical)"* "PRTR (Pollutant Release and Transfer Register) Law to control and report on chemicals" "MSDS (Chemical safety data sheet) Law"* "Labor Safety and Sanitation Law"* "Law for Promoting the Formation of Recycle-oriented society," "PCB Treatment Law"* "Law to Promote Recycled Resource Use," "Law for the Recycling of Containers and Packages" and others	Remolding/reuse of aircraft tires Promote sorting, recovery and recycling Promote the management of measures to comply with PRTR and MSDS laws Treat industrial and medical wastes based on the manifest Eco-Airport Plan(joint with JCAB) ISO14001(Narita maint. Center) ANA Environmental Report, Home Page, Env. Account Environmental social contributions
Information disclosure, promotional activities and their effects Public Information, Propaganda Value	

∗ Items with some penalty (information disclosure, etc.) imposed
□ Laws and regulations recently implemented or strengthened

__ ANA's future tasks

Overview

ANA Group's Corporate Philosophy and Environmental Principles

The ANA Group established the following Action Measures to achieve ANA Group's Corporate Philosophy (Adopted in April 2002, refer to the foreword).

ANA Group's Course of Action

(1) Maintain top priority on safety
(2) Be customer oriented
(3) Continue to society
(4) Embrace new challenges
(5) Debate with active interest, decide with confidence, and execute with conviction
(6) Build a powerful ANA Group by effectively using human resources and focusing on teamwork as a competitive strength

The third principle of ANA Group Action Measures, "continue to move forward with society" means that:

- ANA will always carry on its business in an open and fair manner so that it can contribute to the shareholders and society at large and to the environment.

With this principle in mind, the ANA Group promotes measures that address global environmental problems.

Major environment-related activities of fiscal year 2002

Month	Event	ANA Group activities
April	Start of temporary runway use at Narita Airport.	ANA-Connection starts with code-sharing operation started
May		B777-200ER started Narita-North America flights under ETOPS 207 minutes limit (trans-ocean flight for two-engine aircrafts)
June	Japan ratified Kyoto Protocol.	4th ANA Group environmental training session held.
	Broad-range flight navigation (RNAV) started.	Environmental compliance program started.
July		Held 1st ANA Group Environment Forum in Haneda
		New group company, A-net, started Haneda-Ōshima flights using DHC8-300s.
		B777-300 and B767 planes ordered as the successor equipment of B747SR.
		Company internal journal featured environmental articles.
		Green purchasing using company LAN (e-purchasing) started.
August	Johannesburg Summit	
September		2nd donation of an elementary school in China.
		Participated in environmental management ratings by the Sustainable Management Forum of Japan.
		APU-OFF campaign implemented.
		8th ANA Group Environmental Dialogue held.
		ANA's first fleet of B767F cargo planes started operation.
October	Full implementation of Automobile NOx Law.	Disclosed environmental accounting (for Narita and other regions) for the first time.
	UNFCCC COP8	Received Letter of Appreciation for 41 years of ANA participation in the Red Feather Charity Campaign for.
	Birth of Japan Air Systems (merger between JAL and JAS)	
November		
December	First public use of fuel cell cars	
January	Enforcement of Automobile Recycling Law	
February	Enforcement of Soil Pollution Measures Law	
March	Start of Osaka Airport large-scale test run facility	29th Global Environmental Committee (composed of company executives) meeting held.
		Decision on mid-term action plan for "ANA Group Ecology Plan"
		Head offices of ANA, ANK and other group companies moved and consolidated in the Shiodome area of Tokyo.
		Additional disclosure of environmental accounting (for all airport branches, head offices, and headquarters).
		NCA (Nippon Cargo Airlines) announced renewal plan to use B747-400Fs.

ANA Group Ecology Plan (2003 to 2007)

To put ANA's environmental philosophy into practice, the ANA Group evaluated the results of its 1999 mid-term Action Plan, the "21st Century Action Plan," , and established a new "ANA Group Ecology Plan" in March 2003.

Major contents of the Ecology Plan are:

1) Promote environmental management within all group companies.
2) Elevate CO_2 emission reduction target for aviation fuel consumption (from 10% reduction to 12% reduction), move up the time frame (from 2010 to 2007), and promote measures to counter global warming.
3) Set up quantified targets to promote resource recycling.
4) Promote social and environmental activities through ANA's "Aozora : Blue Sky" program. ."

Environmental Management

In 1998, ANA established the "All Nippon Airways Environmental Philosophy" (refer to the foreword), and participated in the adoption of the "Star Alliance Environmental Declaration" upon joining the Star Alliance in 1999.

In February 2002, the ANA Group was awarded ISO 14001 certification by UKAS of England for its Narita Maintenance Center, which is the maintenance base for international aviation equipment. ISO 14001 is an international standard for environmental management. Knowledge acquired through these activities has been disseminated throughout the group companies.

Environmental Accounting disclosed in fiscal year 2002 was first introduced in the Narita region, but has since been spreading to all group companies, while expanding the scope of accounting. For this year, the ANA Group has collected and disclosed information on environmental accounting for every ANA office in Japan.

The ANA Group began addressing the issue of Environmental Compliance in fiscal year 2002, and confirmed compliance of ANA and 9 ANA Group companies for the first year.

(ANA B777-200)

ANA Group actively participates in environmental management ratings, and all company divisions prepared a joint response for the rating conducted by the Sustainable Management Forum of Japan, which commenced in fiscal year 2002.

Sensing the tide of change, ANA Group finds all these activities useful for improving its environmental management.

Global Warming

Aircraft flights require the use of fossil fuels (kerosene). The ANA Group has always made efforts to introduce the most advanced aircraft that consume less fuel. As a result, the fuel efficiency of our fleets has improved 10% from that of 10 years ago, and this directly contributes to better control of CO_2 emissions from our flights.

The ANA Group will continue to work for greater emissions control through the most appropriate flight operation practices, while renewing its fleet from conventional B747 and B767-200 to B777, B767-300, and others for the future.

Fuel efficiency improvements from switching to newer aircraft types		
Conventional types	Renewed types	Fuel efficiency
YS11 (64 seats) →	A329 (166 seats)	36% improvement
B727-200 (178 seats) →	B767-300 (272 seats)	37% improvement
L1011 (341 seats) →	B777-200 (272 seats)	27% improvement
B747 SR (528 seats) →	B747-400D (569 seats)	14% improvement
B747 SR (528 seats) →	B777-300 (477 seats)	21% improvement
B747-200 (326 seats) →	B747-400 (337 seats)	14% improvement

(Comparison of fuel consumption per unit seat under ANA's standard operation conditions)

Air Pollution and Ozone Layer Protection

(DHC-6-200 of ADK Air Hokkaido)

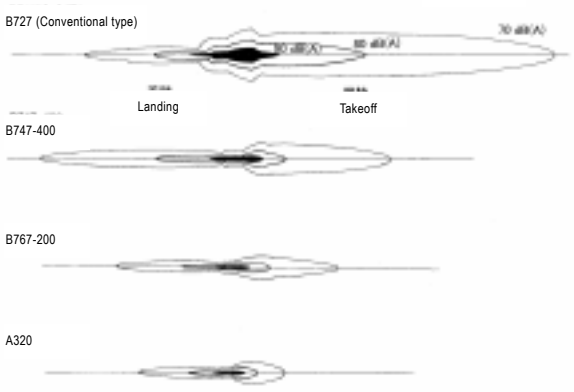
Aircraft exhaust gas includes HC (hydro-carbon), CO (carbon monoxide), NOx (nitrogen oxides), and soot and smoke. ANA Group's aircrafts are equipped with better engines to reduce these emissions and comply with the jet engine emission standards of ICAO and Japan.
Refrigeration equipment installed in ANA aircrafts was switched from designated CFCs to a CFC alternative by 1999.
Moreover, the ANA Group eliminated the use of designated CFCs and Tri-chloro-ethane in maintenance works by 1994.
For fire extinguishers carried on aircrafts, halon extinguishers are still used as no alternatives have yet to be developed or approved.

Noise

All the equipment ANA operates was in compliance with the ICAO Noise Standard Chapter 3 as early as 1994, which was earlier than many of the world's airlines. Moreover, most of ANA's equipment has already cleared the upcoming Chapter 4 Standard (to be applied to new aircrafts after 2006) that was adopted at the ICAO General Assembly in 2001. With its awareness of airport environs as part of its daily operations, the ANA Group aims to become a truly user-friendly airline.

Comparison of noise contour by Equipment

(unit: dB(A))



Emissions/Wastes and Recycling

Our flight-related business activities such as aircraft maintenance inevitably generate various emissions and wastes.
The ANA Group makes efforts to reduce the amount of these emissions and wastes, and to recycle as much as possible as to decrease the need for final waste treatment.
In addition, in fiscal year 2002, the ANA Group started a green purchasing program via an e-purchasing system that connects the entire company.

Social Contribution Activities for the Environment

From fiscal year 2003, ANA and its Group Companies will start a Social Contribution Activities for the Environment program, making the best use of its unique features as an airline company. Under the "Aozora : Blue Sky" program, the ANA Group plans to host an International Environmental Picture Book Contest and to conduct reforestation projects in the areas surrounding each airport in which it operates.

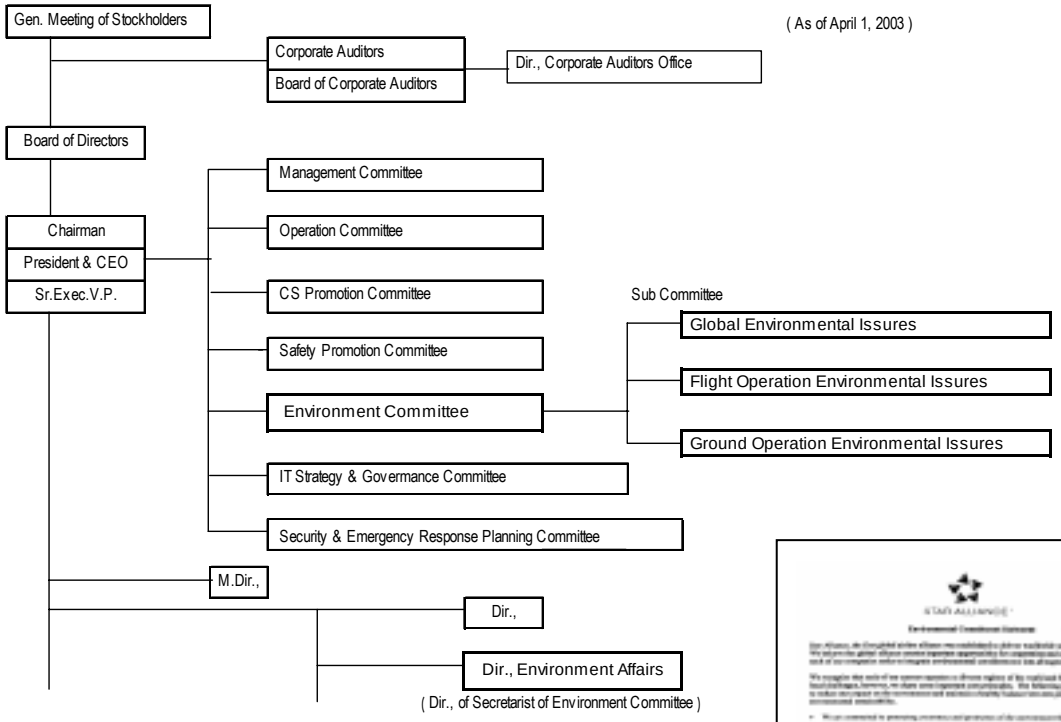
(DHC-8-300 of A-net : Air Nippon Network)

Chapter 1　ANA's Environmental Activities

1. Environmental Milestones

Month/Year	Activity
Nov. 1973	Established the "Airport Division" at the Head Office to oversee ANA's environmental activities.
Feb. 1974	Established the "Committee for Environmental Measures" as an advisory committee reporting to the president. Formed subsidiary organizations under this Committee, including Specialty Committees for: flight noise; ground noise/air pollution; factory waste water; and comprehensive assessment measures. Held the first committee meeting in July.
July 1990	Established the "Environmental Conservation Promotion Office" to address global environmental issues through conventional pollution source measures. Specialty Committees were reorganized into three: flight noise; ground noise/pollution; and energy saving measures. The Specialty Committee for Energy Savings was renamed the Specialty Committee for Global Warming Measures in 1993.
May 1993	Started the annual publication of ANA Environmental Report (from 1992).
June 1999	Renamed the "Environmental Conservation Promotion Office" to "Global Environmental Conservation Promotion Department," and the "Environmental Measures Committee" to "Global Environment Committee." Renamed other environment-related committees to "the Specialty Committees for: Global Environmental Flights, Ground Environment, etc."

Organization (Environment)



2. Environmental Policy and Mid-Term Action Plan

ANA Group conducts its business operations based on the "Corporate Philosophy" (Revised in April 2002) and the "Environmental Policy" (introduced in May 1998), and signed the "Star Alliance Environmental Declaration" in May 1999.

ANA introduced a mid-term action plan called the "21st Century Action Plan" in May 1999, and implemented the plan accordingly. The Action Plan was reviewed after achieving its original purposes, and was developed into a new "ANA Group Ecology Plan (for 2003-2007).

The new Ecology Plan features the following:

(i) All ANA Group companies will promote environmental management jointly.

(ii) Global warming mitigation target: 12% reduction in aircraft CO2 emissions per seat-km (ASK) by 2007 from 1990 levels. (More ambitious than the airline industry target of 10% reduction by 2010.)

(iii) Reduce wastes and to promote recycling, while aiming for zero emissions.

(iv) Set up quantified targets for items such as wastes, which used to have no definite targets.

(v) Inclusion of social contribution activities for the environment and plans to promote such practices.

ANA Group Ecology Plan (2003/2007) Prepared by the Global Environment Committee on Mar. 26, 2003

Promotion of Environmental Management
- ISO14001
  Develop environmental management systems based on ISO 14001 throughout the Group
- Environmental Accounting
  Implement Group environmental accounting system
- Environmental Compliance
  Strengthen legal management and promote the thorough compliance with relevant laws and regulations.
- Environmental Communication
  Provide Environmental Reports that are easy to read for our stakeholders, and reflect their comments and opinions within our environmental management
- Group companies
  Promote environmental management together in a transparent way

Global Warming Mitigation Measures
- Reduction of CO_2 emissions from aviation fuels
  12% reduction in CO_2 emissions per seat-kilometer by 2007 from 1990 levels
- Reduction of energy consumption at business locations
  5% reduction of power and thermal energy consumption at business locations in comparison with 2002 levels

Air Pollution Measures
- Reduction of aircraft HC emissions
  Retire engines not conforming to ICAO's standard for engine emissions
- Introduction of low pollution vehicles
  Double the ratio of low pollution cars and low emission gas vehicles
- Ozone layer protection measures
  Maintain zero emission of regulated substances

Abatement of flight noise
- Conformity with ICAO's noise standard (Chapter IV)
  Every aircraft to conform with Chapter IV standard by 2007

Realization of Resource Recycling
- Waste reduction
  Aim for zero emissions in the future, annually disclose recycling results, and achieve 15% ratio of final disposal volume for industrial wastes by 2007
- Promote green purchasing
  Green purchasing for 100% of copy paper, and 80% of other office supplies by the end of 2007
- Reduction of chemical use
  Develop alternatives for PRTR-controlled substances, and annually disclose the reduction results

Promote "Aozora, which means Blue Sky" (social contribution activities for the environment) Campaign
- Picture books about environment
  Annually hold an International Environmental Picture Book Competition
- Reforestation projects
  Promote greening activities in and out of Japan

ANA Group companies: Linked subsidiaries (airlines, ground handling service companies, maintenance service companies, etc.)

3. ISO 14001 Environmental Management Certification

In February 2002, ANA acquired ISO 14001 (Environmental Management System) certification from UKAS, a UK-based review and registration organization, for the Narita Maintenance Center of Maintenance Division, which is the center of ANA's international fleet. ANA was the first aircraft handling business in Japan to attain certification. Using the knowledge acquired through the certification process, ANA exerts every effort to promote environmental conservation throughout the ANA Group.


Certificate of Approval

(Certificate of ISO 14001 from UKAS by BVQI)

4. Environmental Compliance Program

To respond to the growing interest in corporate social responsibility, and the extended scope of corporations' responsibilities in recent years, ANA implemented the following actions in fiscal year 2002, continuing its actions from the year before, through document and on-site surveys .

1) Clarify the environmental laws and regulations applicable to each business location.
2) Identify environment-related business activities and equipment and facilities at each business location.
3) Confirm the compliance status of environmental laws and regulations

As a result, ANA confirmed 217cases at 39 locations (30 at ANA and 9 at group companies) in which some conflict with environmental laws and regulations was confirmed.

	Applicable environmental laws and regulations	Number of locations with regulative issues (companies) (Total 39)
1	Law for the re-manufacture of specific home appliances (Home Appliance Recycling Law)	37
2	Waste Management and Public Cleansing Law	37
3	Law Concerning the Protection of the Ozone Layer through the Control of Specified Substances and Other Measures (Ozone Layer Protection Law)	25
4	Law for ensuring the implementation of recovery and destruction of fluorocarbons related to specified products (Fluorocarbons Recovery and Destruction Law)	27
5	Law concerning special measures for promoting appropriate treatment of polychlorobiphenyl wastes	2
6	Law concerning reporting, etc. of releases to the environment of specific chemical substances and promoting improvements in their management (PRTR Law)	15
7	Law for the rational use of energy (Energy Saving Law)	5
8	Air Pollution Control Law	5
9	Law concerning special measures for total emission reduction of nitrogen oxides and small particles from automobiles in specified areas (Automobile NOx-PM Law)	8
10	Water Pollution Control Law	10
11	Sewage Control Law	1
12	Septic Tank Control Law	4
13	Noise Regulation Law	5
14	Vibration Regulation Law	4
15	Offensive Odor Control Law	9
16	Factory Allocation Law	1
17	Law for developing pollution prevention organization at specified factories (Pollution Prevention System Development Law)	1
18	Toxic and Hazardous Substances Regulation Law	15
19	Container and Packaging Recycling Law	6

There were no cases of environmental accidents, legal penalties or litigation.

5. Environmental Accounting

To quantitatively determine the cost of environmental conservation activities, ANA introduced its Environmental Accounting system starting in fiscal year 2001. We first disclosed the primary results of the Narita Airport region and others in last year's edition of the ANA Environmental Report, and later disclosed more extensive records covering all airport branches, head offices, headquarters, etc. on the ANA web site.

For fiscal year 2002, the accounting results cover all ANA companies (in Japan) including head offices and marketing divisions Specifically regarding the introduction of energy saving aircraft and the use of ground power units (GPU) for parked aircraft, the accounting record covers group companies such as Air Nippon (ANK) and Air Japan (AJX).

Environmental Accounting Record for Fiscal Year 2002

Environmental Cost Items		Costs	Major Activities
Costs at each site	Pollution prevention costs	691	• Sewage treatment costs • Appropriate effluent treatment
	Global environmental conservation costs	14552	• Introduction of energy-saving aircraft • Use of ground power while parked
	Resource recycling costs	491	• Appropriate waste treatment • Reduction, sorting and recycling of wastes
Upstream and downstream costs		9	• Green purchasing for cabin service goods • Purchasing of treated water • Measures to comply with packaging recycling law
Management activity costs		5330	• Cleaning of aircraft's interior • Labor costs for environmental management • Environmental education
Research and development costs		0	• Research and development of environmentally friendly equipment
Social activities costs		144	• Raising awareness for wildlife protection
Environmental damage recovery costs		-	Not applicable
Total		21217	(unit: million Yen)

Covered divisions:
Whole company and divisions of All Nippon Airways Co.
(Except overseas branches)

For the procurement of energy saving aircraft:
Air Nippon and Air Japan

Period:
Fiscal Year 2002
(April 1, 2002 - March 31, 2003)

Reference:
Guideline of the Ministry of Environment

Environmental Accounting: Accounting system to measure and analyze environmental conservation costs incurred through business activities, in a quantifiable way. In this report, only environmental costs are summarized.

More than 80% of total global environmental conservation costs of 14,552 million Yen was for the purchasing and leasing of energy-saving and lower noise aircraft.

The ANA Group appropriates 10% of its depreciation costs and leasing costs of aircraft for environmental accounting.

6. Environmental Communication

The ANA Group has prepared an Environmental Report every year for 10 years since the 1992 version (published in 1993), and has made them available to the broader public as well as to employees. English versions of the Environmental Reports have been made available since the 1998 report, and have been available on the ANA web site (http://www.ana.co.jp) since 1999.

Since 2001, ANA Environmental Reports have conformed to the Environmental Report database developed by the Ministry of Environment. (http://www.kankyohokoku.jp)

In addition, ANA publishes environment-related articles in its annual publications "Retrospect and Prospects" and its Annual Report, and prints environment-related news, whenever possible, on the ANA Quarterly Statement of Accounts, sent to our shareholders.

An e-mail address (kankyou@ana.co.jp) has been set up as a way to contact the ANA Environmental Division.

In June 2002, ANA held its "First ANA Group Environmental Forum of" with more than 150 attendees from both within and outside of the company as well as top executives of ANA Group companies. The Forum provided a valuable opportunity to increase environmental awareness, with speakers from the Ministry of Environment, Ministry of Land, Infrastructure and Transport, and Cosmo Oil Co., as well as presentations by ANA Group companies.

Additionally, ANA held the 8th ANA Group Environmental Issues Contact Meeting (30 companies participated) in September 2002, and discussed information sharing and the future direction of environmental issues among group company representatives.

Within ANA itself, we conducted an environmental issues questionnaire with our employees for the purpose of raising their awareness (received 999 responses), and published special articles on global environmental issues in our inter-company journal (July 2002 edition), and promoted awareness through ANA Group LAN.

7. Responding to environmental management ratings

In recent years, the importance of "environmental management" has emerged, which combines not only global environmental conservation measures but also consideration for sound business management and living in harmony with society.

In response to this trend, ANA has participated in ratings activities conducted by the Sustainable Management Forum of Japan(Sustainable Management Rating Institute), since fiscal year 2002, with the efforts extending beyond the framework of our organization. Although participation requires much time and energy on our part, what we acquired from this activity was far greater and valuable than the time spent.

ANA also participated in environmental rating activities overseas, and has been ranked fifth (A Grade) among the major airlines of the world, according to Innovest's (USA) EcoValue'21 ® rating methodology.

These assessments are described in detail in the chapter concerning Independent Opinions.

8. Current cooperative relationships with outside organizations

Below is a chart outlining the current status of ANA's affiliation or cooperation with environmental organizations outside of our corporate group.

Fiscal Year	Name of organization	Contents
1991	Environmental Information Center	Disseminating and providing science and technology information on environmental conservation, this organization was established with the support of the business community; ANA cooperated in its establishment.
	Global Environmental Forum "Environmental Study Group"	Conducts research, research results exchange, and dissemination on global environmental issues, provides support for environmental conservation activities, and develops international cooperation. ANA is a member and uses their services for environmental information.
	Japan Flower Promotion Center	Successor to the "International Flower and Green Exposition," this organization promotes the spread of flowers and greening of national land (under the Ministry of Agriculture, Forestry, and Fishery). ANA supports such a concept and offers cooperation.
1992	Greening of Land Promotion Institute	Promotes the greening of land (under the Ministry of International Trade and Industry as well as the Ministry of Agriculture, Forestry and Fishery). ANA cooperates with this organization.
	IATA Environmental Task Force (ENTA F)	ANA participated in the 5th regular meeting (May 1992) as an observer. Organized by ENTAF, the first international seminar for "Aviation Environment" was held at the ANA Hotel (then) in Washington, DC in March 1993, and ANA co-sponsored the event.
1993	International Noise Control Engineering Conference	ANA provided support for the 23rd Inter-Noise Conference and Exhibition held in 1994 in Yokohama.
	(Council on Life-Innovation)	ANA participated in "Asian Survey Mission on Development and Environment" hosted by this organization.
1994	Tokyo Implementation Committee for Global Environment	ANA supported the concept of Tokyo Meeting on Global Environment held in October 1994 and offered cooperation.
1995	Fund to Protect Nikko Cedar Tree-Lined Streets of Tochigi Prefecture, and Oze Protection Association	ANA supported and offered cooperation for various projects to protect "Oze" (valuable wetland) and "Nikko Cedar Tree-Lined Streets."
1996	Green Purchasing Network	ANA registered as a member of this Network to promote the purchasing of products with less of an environmental impact. (February 1997)
1997	Kyoto Conference to Mitigate Global Warming (UNFCCC COP3)	ANA made a donation to COP3 to conference held in December 1997.
1999	Japan National Trust	ANA supports and offers cooperation for activities to protect tourism resources of Japan including cultural assets and natural scenery.
2000	Star Alliance Environmental Consultation Meeting (Tokyo)	ANA hosted the Tokyo Meeting of environmental officers of Star Alliance companies.
	Green Port 2000 (Narita)	ANA s the ACI (Airports Council International) World Conference and Exhibition on Airport Environment, co-hosted by ACI, Narita Airport Co., and IATA (International Air Transport Association)
2001	Environmental Sub-committee, Scheduled Airlines Association of Japan	ANA participated in the organization of an Environmental Liaison Group of 3 airlines which held a meeting in 2001. From this group meeting, the establishment of the Environmental Sub-committee under the Regular Airline Association's Planning Committee was formalized. ANA participated in this sub-committee's establishment.
	ECOmmerce Environmental Scenario Project	ANA participated in this project to develop business scenarios in view of future environmental issues.
2002	UNEP International Aviation Environmental Symposium	An ANA representative was invited and participated as a panelist in this International Aviation Environmental Symposium co-hosted by UNEP and European NGOs.
	Environmental Management Rating	ANA participated inits first Environmental Management Rating (aimed to standardize rating within 3 years), conducted by the Environmental Management Academy with the support of Ministry of Education and Science, etc.

In addition, ANA participates in the following environment-related organizations of the airline industry.

- ANA Group Airlines Society (ANA, ANK, AJX, and NCA)
- ANA Group Global Environment Contact Group (38 group companies, increased by 8 companies from last year)
- Scheduled Airlines Association, Environmental Sub-committee
- Star Alliance Environmental Working Group
- Star Alliance Environmental Asian League (NH, SQ, and TG)
- International Air Transport Association, ENTAF Environmental Working Group
- Alliance of Asia-Pacific Airlines (AAPA), Environmental Working Group
- International Commercial Airlines Organization (ICAO), CAEP Jet Gas Working Group

Chapter 2 Global Warming

1. Background on Global Warming and Counter Measures

According to the 1995 report of the Intergovernmental Panel on Climate Change (IPCC), temperature rise due to the accumulation of greenhouse gases since the 19_{th} Century is expected to reach about 1° C by 2050. If GHG accumulation continues to increase at the current rate, then average temperature is projected to increase by 1.4 to 5.8 °C, and sea level will rise about 9 to 88 cm by 2100.

IPCC was established in November 1988 by UNEP (United Nations Environment Programme) and WMO (World Meteorological Organization) to officially study the scientific aspects of global warming for governments.

IPCC assessed the scientific knowledge on the effects of aircraft emissions on global warming, reviewed various options to mitigate the adverse effects, and published the Special Report on "Aviation and the Global Atmosphere" in May 1999. An outline of this report is shown at the end of this chapter for reference.

Following the declaration of the "Ministerial Meeting on Air Pollution and Climate Change" in 1989 that called for the conclusion of a framework treaty to address global warming mitigation, the United Nations Framework Convention on Climate Change was adopted in May 1992.

Its First Conference of Parties (COP1) was held in Berlin in March 1995, at which time it was decided to prepare a protocol for measures for industrialized countries to take in 2000 and beyond.

At the third Conference of Parties (COP3) held in Kyoto in December 1997, a document to determine legally binding targets for developed countries to reduce GHG emissions was adopted as the "Kyoto Protocol." The Protocol also urges developing countries to participate in such measures to a certain degree.

At the seventh Conference of Parties (COP7) held in Marrakesh, Morocco, in November 2001, the Parties decided by consensus to operational modalities without the participation of the US in the Protocol.

Major provisions of the Kyoto Protocol are shown in the "reference" page at the end of this chapter.

2. Domestic Background

Japan set a target of 6% reduction of greenhouse gas average emission from 1990 levels from 2008 to 2012, established the "Guidelines for Measures to Prevent Global Warming" in 1998, and enforced the revised Energy Saving Law in April 1999. In January 2002, the government reviewed the Guidelines for Measures to Prevent Global Warming and ratified the Kyoto Protocol in June 2002, following which it then approved the new Guidelines for Measures to Prevent Global Warming.

In a review of CO_2 emissions by sector in Japan for fiscal year 2000, the industrial sector shares 40.0%, residential 25.8%, and transport sector 20.7% (please refer to Fig. 2-1). Comparing these shares with the numbers from fiscal year 1999, the residential sector increased its share slightly but the transport sector decreased.

Among ANA's businesses, functions that emit greenhouse gas include aircraft operations, ground maintenance of aircraft/engines, and office activities."

The types of greenhouse gases emitted from aircraft operations include CO_2 (carbon dioxide), NOx (nitrogen oxides, increase in tropospheric ozone), water steam (formation of contrails), CFC (chlorofluorocarbon), HCFC (hydrochlorofluorocarbon), and others. For engine emissions of NOx and others at flight altitudes of 1000 m or below (LTO cycle), please refer to Chapter 3, "Air Pollution."

Regarding the effects of engine emissions (including water steam) at flight altitudes over 1000 m, even IPCC's Special Report states that scientific evidence is insufficient. Currently the ICAO (International Civil Aviation Organization) is reviewing the calculation method for NOx emissions. Aircraft do not emit other greenhouse gases of concern in the Kyoto Protocol, such as CH_4 (methane), N_2O (Nitrous Oxide), and PFC (perfluorocarbon). In this chapter, we discuss CO_2 emissions.

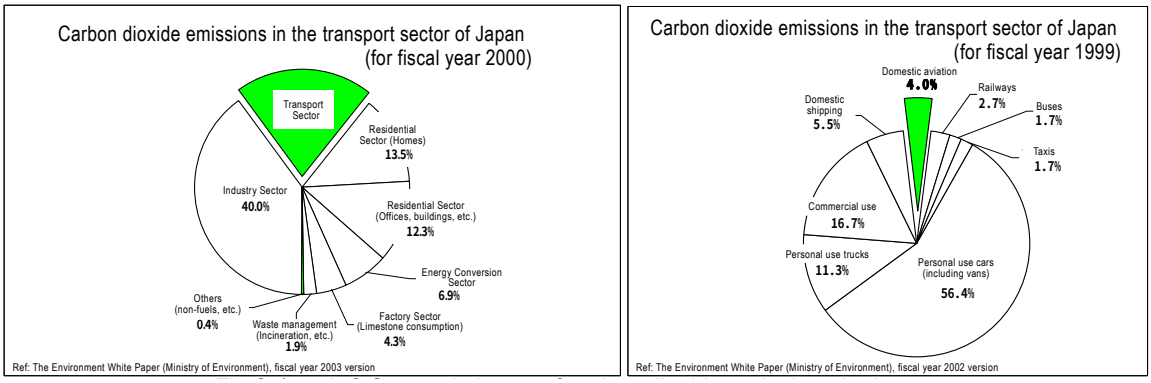


Fig. 2-1 and 2-2 Sectorial shares of carbon dioxide emission in Japan

According to ICAO statistics, the worldwide quantity of aviation CO_2 emissions is about 30-40% of total fossil fuel CO_2 emissions. The share of CO_2 emissions from domestic aviation in Japan was about 4.0% of the transport sector in fiscal 1999, and about 0.9% of the total industrial sector emissions. Therefore, aviation's contribution to global warming seems extremely low at this point (please refer to Fig. 2-2).

Regarding CO_2 emissions from so-called bunker oil in international transport (aviation and shipping), the ICAO and IMO (International Marine Organization) are undertaking the review.

In the Guidelines for Measures to Prevent Global Warming revised in 2002, the target value for the improvement of energy efficiency for new aircraft was set at about a 7% reduction from 1995 levels of CO_2 emissions per energy consumption unit on average from 2008 to 2012.

In September 1996, the Keidanren (Japan Federation of Economic Organizations) requested airline companies to prepare a voluntary action plan on environmental conservation (CO_2 emission reduction targets with concrete measures for reduction) and three airline companies, ANA, JAL, and JAS,(later under the Scheduled Airlines Association of Japan) determined the target value for CO_2 emissions at about a 10% improvement from 1990 levels in transport units (available seat-km) by 2010. In addition, they established the main approaches they would take as concrete measures to achieve target values, including the promotion of renovation of old aircraft and introduction of new aircraft types with improved fuel consumption, active introduction of FANS (futuristic air navigation system, CNS/ATM etc.), and the implementation of routine service practices with less fuel consumption.

In February 1998, the Ministry of Transportation (now the Ministry of Land, Infrastructure and Transport) requested the airline industry to submit a voluntary plan to mitigate global warming, and the airline industry duly complied by submitting the plan with almost same content as the one the Scheduled Air Transport Service Association submitted to Keidanren.

The airline industry regularly follows up with the implementation of these plans.

3. Transition and Current State of ANA's Fuel Saving Measures

(1) ANA Group Ecology Plan (2003-2007)

In March 2003, ANA developed its ANA Ecology Plan (an action plan aiming to reduce the environmental impacts of ANA Group companies, and to contribute actively to the protection of the natural environment.)

The plan includes the following actions to address emissions reduction of CO_2 (carbon dioxide), which is a major cause of global warming:

(i) Decrease CO_2 emissions from aviation fuels

(ii) Reduce the amount of energy consumed at offices and business sites.

In particular, regarding the consumption of aviation fuels, which is the largest CO_2 emissions source in our business, we greatly revised our previous target by increasing the reduction goal by 2% and advancing the target achievement time by three years from the original plan, with an aim for more efficient fuel use,.

"ANA will reduce CO_2 emissions per available seat-kilometer by 12% from 1990 levels by 2007"

(original target was 10% reduction in CO_2 emissions per available seat-km from 1990 levels by 2010)

(2) CO_2 emissions

ANA's CO_2 emissions from aviation activities were equivalent to approximately 1.96 million tons of carbon in 2002 (approx. 7.18 million tons of CO_2). Because the demand for air transport is expected to increase in the future, the consumption of aviation fuel will also increase. For airline companies, there is no appropriate alternative for current fossil fuels; therefore, we must use fuels efficiently. In other words, we need to exert every effort to transport customers efficiently while using less energy.

Fig. 2-3 shows ANA's record of CO_2 emissions per available-seat-km. Fig. 2-4 shows the ANA Group's record of CO_2 emissions per available seat-km. As shown, CO_2 emissions per unit seat-km have tended to decrease, despite the significant increase in the number of available seats as the demand for air transportation grows. After 2000, both ASK and fuel consumption rates dropped, suffering from the effects of recession, terrorist attacks in the US, the Iraq War, and SARS (Severe Acute Respiratory Syndrome).

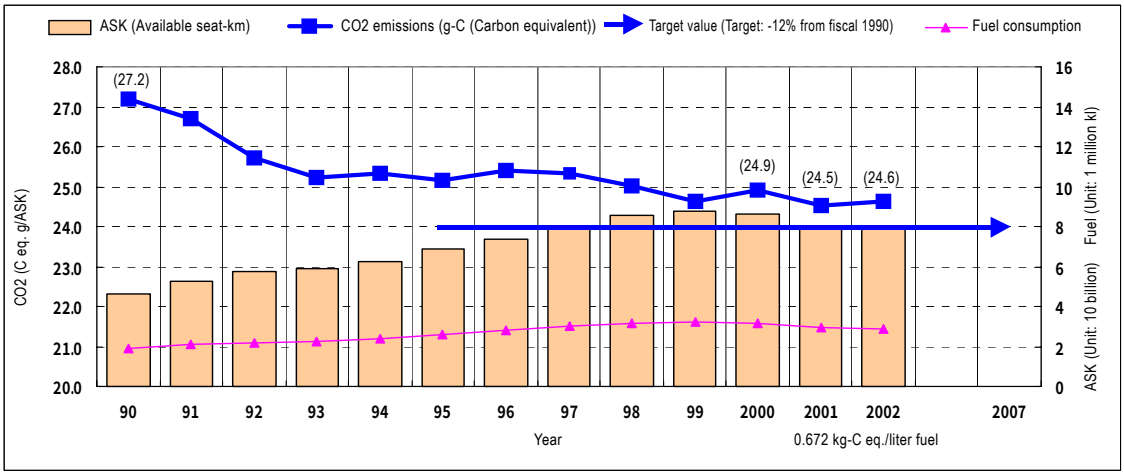


Fig. 2-3 ANA's CO_2 emissions per available seat-km (ASK)

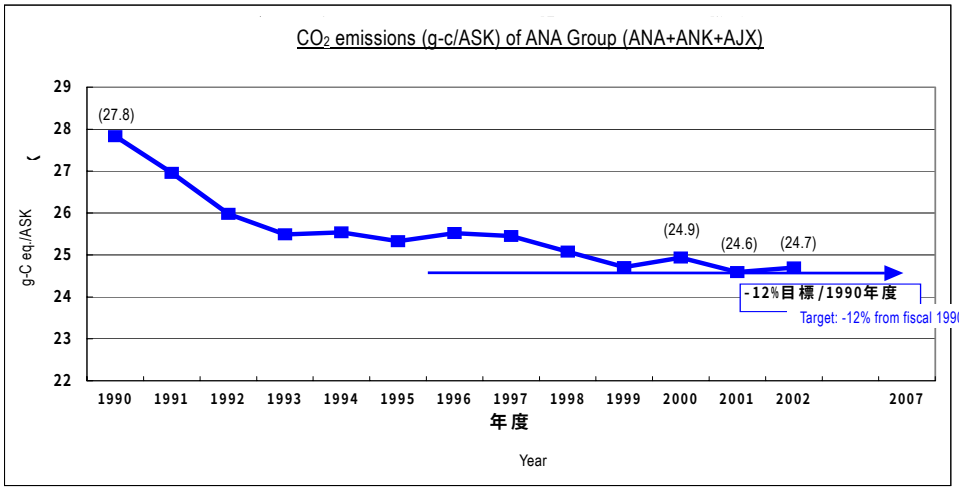


Fig. 2-4 CO_2 emission of ANA Group per available seat-km (ASK)

(3) Introduction of the Latest Aircraft Technology

To reduce CO_2 emissions, or in other words to reduce fuel consumption, we have found that the most effective method is to introduce the most fuel efficient aircraft, which have efficient engines with a higher bypass ratio, use the most advanced engine technology, reduce air resistance through improved wing forms, etc., and reduce body weight through the use of composite materials. Fig. 2-5 shows how the introduction of new aircraft has reduced our CO_2 emissions. Types of aircraft are shown in order of year of introduction from left to right.

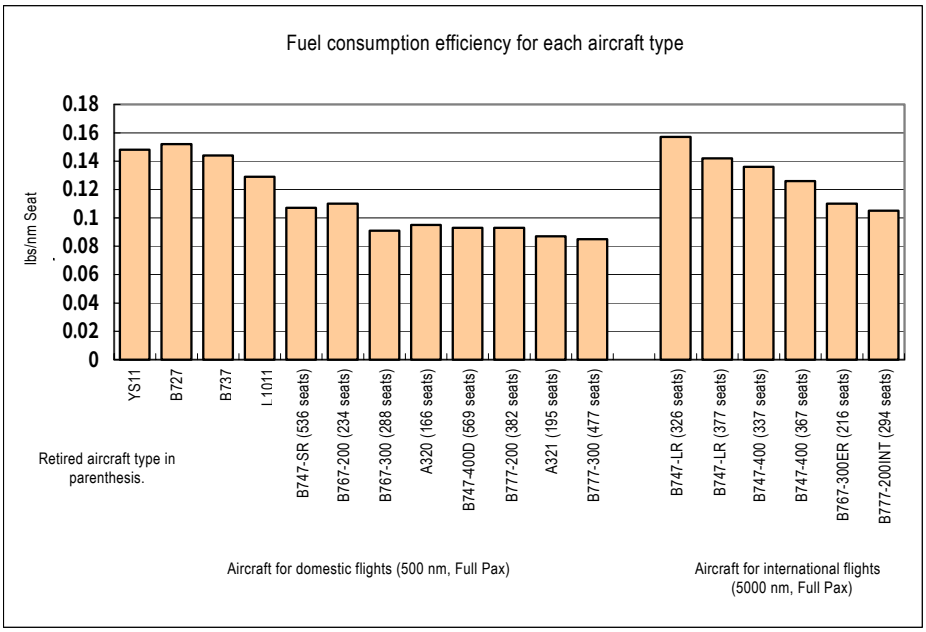


Fig. 2-5 Fuel consumption efficiency of each aircraft type

At the end of this chapter, the introduction year and retirement year are shown for each aircraft of ANA and ANK

.

(4) Fuel saving measures

From the first Oil Crisis in 1973 to the second Oil Crisis in 1979, ANA examined every fuel saving measure possible and implemented many such measures. In fiscal year 1994, ANA reviewed these measures and in fiscal years 1996 and 1999, studied the fuel saving measures of

aircraft body weight reduction. Table 2-1 shows these major fuel saving measures.

No.	Fuel saving measure item	Contents
1	Suitable approach and departure method for Kagoshima airport	Improvement of departure and approach method : To revice SID(Standard Instrument Departure) method and STAR(Standard Arrival Route), and to shorten the route in order to reduce the fuel consumption
2	Profile Descent to New Chitose airport RWY01	
3	Selection of suitable approach method and shortening radar inducement route in Kumamoto airport	
4	Improvement of radar inducement route in Fukuoka airport	
5	Change of Matsuyama airport departure route	
6	Passing through the test and training area of the Air Self Defence Forces	To shoten the route distance by passing the area on weekends(Sat, Sun, and National holiday) in which the ASDF do not train
7	Selected the best cruise speed	To save the fuel by optimizing the cruise speed
8	Selected the cruise altitude	As the altitude is raised, fuel efficiency improve at 1% per 1000feet
9	Delayed Flap Approach	To delay the use of landing flap with a lot of air resistance when approaching the airport in order to reduce the fuel consumption
10	Use of low flap angle	To use a low flap angle that decreases the air resistance in order to save the fuel
11	The best bleed air management (Reduced Pack Flow Operation)	Air for the air conditioner is taken from the engine By optimizing the amount of taking this, the lowering of efficiency of the engine is minimally suppressed, which in turn saves the fuel
12	Unnessary engine shut down when taxi-in	Stopping unnecessary engines after the landing to ramp in
13	Engine start during push back	The aircraft used to be pushed backt to the taxiway after all engines are started But from now on the engines will start going during push back
14	Standardization of Max. Climb Thrust(MCLT) use	To stop the use of delayed thrust, and to use the thrust with which the higher altitude can be reached eary with the efficient fuel consumption
15	The best effect approach	An effective approach by the idling pass planning leads the fuel saving
16	Optimization of the loading fuel	Reviewing the fuel loading standard and improving its operation leads the fuel saving
17	Expansion of reducing APU (Auxiliary Power Unit) operation	Delaying the time of the APU start before the departure and after the landing will save the fuel
18	Reducing APU use	Not to use APU, ANA normally taxi-in with APU off operation
19	Washing the engine in clear water(CF6-45 Engine)	The compression efficiency is recovered by washing the compressor with clear and by taking off the dirt of the compressor blades
20	Modification of Thrust Reverser Nacelle Seal(CF6-45 Engine)	Thrust reverser and the seal around nacelle are improved and added in order to prevent the air leakage that will improve the efficiency of the thrust of the fan

Table 2-1 Fuel saving measures (1/2)

	Fuel saving measure item	Contents
21	Controlling the position of center of gravity	In general, the fuel saving of about 0.05% can expected once the center of gravity moves backward by 1%
22	Using a simulator for flight training	The flight training is done with the simulator instead of actual flight Using the simulator for the co-pilot periodical check
23	Using a simulator for mechanic training	The training of Engine operation and Troubuleshoot are done with Ground Simulator instead of actual engine run
24	Removal of Brake Cooling Fan	Fan are removed for weight reduction by examining the necessisty
25	Removal of Rain Repellent System	Depletion of ozone layer related problem This system was removed by examining the necessity in operation
26	Tankering	The tankering becomes an increase of the wight of the airplane Evaluate carefully the expenses and effects when the tankering is executed
27	Lightning cargo containers	Reduction in loading of the drinking water is examined in international flight
28	Reduction in loading of drinking water	Reduction in loading of the drinking water is examined in the international flight
29	Removal of drinking water cooler	Removal of cooler which is not in use Reduction of about 40lbs
30	Other weight reduction measures	Replaced to light goods : Meal tray, Meal Cart, Seat Cushion, Passenger Seat, Carpet, Life Jacket Reduction the No. of loading : Ice and Dry-ice, Blanket, Cockpit Manual, Spare of Inflight Magazine"Wingspan" and Weekly Magazine Change the wet towel made from the fabric to the paper In-flight articles are loaded at each station
31	Introduction of FMS/R-Navigation Method on Domestic route (Enroute & Airport terminal area)	Reduction of flight path time due to R-Nav route setting after 1990 and R-Nav operation around terminal area after 1997
32	RVSM(Reduced Vertical Separation Minimum) operation on International flight	Vertical separation of aircraft by 1000ft above FL290 rule was started 2000 Aircrafts are allowed safeley fly more optimum profiles, and gain fuel saving and increase airspace capacity
33	CAT III Automatic landing system Operation	Equipment to enable safe landing in bad weather, so as to avoid diverting to airports other than the original destination As of 2003, operational in Narita, Kushiro, Kumamoto, Heathrow(UK), Frankfurt(GER), Johon F.Kennedy, and Los Angeles(US) Airport
34	Reviced Fuel quantity onboard in International flight plan (New Contengency Fuel)	New Contengency Fuel Method(load 5% fuel instead of 8.5% of burning) changed from Re-clear started 2002, and save 2 to 3 thousand Lbs fuel at NRT-EU flight
35	Reduction of flight route distance at Kansai to Haneda Route	Flight route via the Suzuka mountains was changed in 2001 and saved 6 minutes and 2000Lbs(B747-400) fuel per flight
36	Increase the operation of ETOPS (Extended range Twin engine aircraft Operations)	Rule to determine the time to a potential landing airport at cruising speed, with one engine stopped in two-engine aircraft The rule enables longer distance operation for two-engine aircraft, allowing a more direct flight path connecting two cities, thereby saving fuel ANA has gradually expanded the use of this rule, since its application of 120 minutes to B767 flight between NRT-BKK, and from 2002, has been operating B777-200ER under 207 minutes rules NRT-USA routes
37	Actual practice of VNAV-Approach Procedure(continuos descending procedure)	The procedure is to maintain higher altitude until airport vicinity, and apply continuous descending from higher altitude to reduce noise and save energy ANA started the implementation of this procedure at New Chitose airport Runway 19 using B747-400, B777, and B767, and is considering extending application to other aircraft in the future

Table 2-1 Fuel saving measures (2/2)

(5) Fuel savings in daily operations

Airport congestion is a factor in increased fuel consumption. In some cases, fuel is wasted while planes fly in a holding pattern for landing, or when planes must perform a “go-around” landing (re-attempt a landing). In the case of Haneda Airport, the busiest airport in Japan, go-around landing maneuvers in 1994 occurred 148 times for all airlines. While there are many reasons behind the need for go-around landing maneuvers, 43% of the total was due to insufficient distance between aircraft because of a delay in the preceding aircraft’s takeoff or taxiing out from a runway. If each aircraft were to depart the runway as soon as possible, this number of go-around maneuvers would improve, but in addition, ANA adopts the following conditions for takeoff and landing.

(i) Grasp the stoppable distance and the distance to taxi way before landing
(ii) After landing, decrease speed smoothly to enable quicker pulling out of runway to a taxi way at safe speed.
(iii) For takeoff, be ready to line up immediately after the preceding aircraft starts takeoff run.
(iv) Complete all of required cockpit operations at minimum time after receiving takeoff permission.

In addition, ANA appropriately implements “intersection takeoff” and “rolling takeoff” as required.

(6) Airport congestion

Airport congestion is also a barrier to more efficient fuel use. The distance from an airplane parking spot to the runway affects fuel consumption. Increased taxiing time after the completion of Narita No. 2 terminal and the Haneda new Runway C is a factor for this efficiency drops. For example, an examination of taxiing time before and after the start of Haneda C runway use indicates that taxiing out time for northward departures in winter increased by about three minutes on average (January 1997: 12.6 min.; and January 1998: 15.7 min.) For taxiing in, on the other hand, the time for the same period was actually shortened by one minute from 6.7 minutes to 5.7 minutes. For fiscal year 2000, the annual average of taxiing out time was 13.9 minutes, and taxiing in was 6.1 minutes. The result of fiscal year 2002 was 14.0 minutes taxiing out and 6.0 minutes taxiing in.

(7) Start of wide range navigation procedure

From June 13, 2002, the wide range navigation procedure (RNAV) was implemented, with an aim to have smoother flow of flights by two-tracking or four-tracking the flight paths that connect radio-guidance facilities, changed from conventional linear tracking paths. Through this, it has become possible to operate flights at the shortest distance possible, as there is no need to fly a zigzagging path to connect to radio guidance facilities, improving flight operation efficiency.

(8) Energy savings other than jet fuel (Energy savings at offices, business sites, and factories)

Although energy saving in this area may be minimal compared with aviation fuel consumption, it is important for airline companies to conserve energy used at ground facilities. Major factors of energy consumption in these facilities include fuel for ground vehicles and utility consumption at factories and offices, including electric power, gas, water, and hot water. Fig. 2-6 shows the past record of electric power consumption at ANA facilities in the Haneda area.

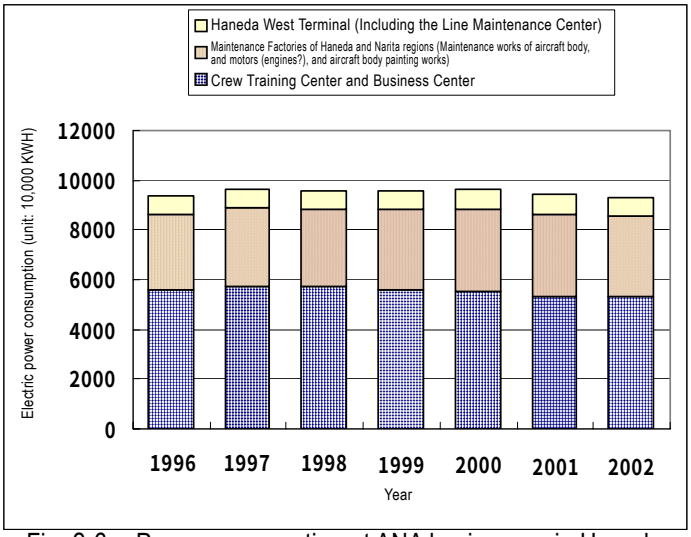


Fig. 2-6 Power consumption at ANA businesses in Haneda region

(9) Revision of the “Energy Saving Law”

As a part of Japan’s global warming mitigation measures, the Energy Saving Law was revised and enacted in April 1999 with an aim to reduce energy consumption. Through this revision, designated Class 2 energy control factories were designated in addition to conventional Class 1 energy control factories. Moreover, this Law was further revised and reinforced in April 2003, and designates office buildings as Class 1 if the quantity of energy consumption is large enough. In the case of ANA, four business locations (Airframe Maintenance Center (West), Flight Crew Training Center, Business Center Building, and Engine Test Cell) were designated as Class 2 energy control factories. Among them, the Flight Crew Training Center and Business Center Building and Airframe Maintenance Center (West)are to be designated, together, as Class 1. ANA established the “Energy Management Meeting” consisting of business locations with greater energy consumption, including the above mentioned designated energy control factories, and plans to address the requirements appropriately.

Because the Crew Training Center and the Business Center are located in the same lot, and their building maintenance is carried out by the same company (Saywa Service Co.), ANA launched the Energy Saving Committee, consisting of all tenant corporations and divisions (flight crew , cabin crew and maintenance crew education and training, computer system administration, various facilities maintenance companies, cafeteria, etc.). These two office buildings are the most power-consuming buildings of the ANA Group, and through their energy-saving efforts they achieved about a 1% reduction in energy use in fiscal year 2002, from the previous year. ANA plans to further strengthen these efforts for fiscal year 2003.

In addition, the Ordinance to Prevent Global Warming of the Tokyo Metropolitan Government targets the fuel consumption of transport business corporations, and ANA submitted a report to them on the company’s fiscal year 2001 results, as well as its three-year plan of global warming prevention measures. (The report and plan are accessible at each business location.)

[Reference]

1. IPCC Special Report "Aviation and the Global Atmosphere"(May 1999)

The IPCC published a special report on Aviation and the Global Atmosphere, in response to a request by the ICAO, to assess the effects of aviation on the earth's climate and atmospheric ozone. The report also examines Scientific, technological, social and economic issues associated with Various options to mitigate adverse effects of aviation on climate and Atmospheric ozone. The brief overview of the report is as follows.

(1) In response to a request by the ICAO, IPCC assesses the effects of aircraft on climate and atmospheric ozone, both in the past and in the future (2050).

(Note) IPCC Second Assessment Report, published in 1995, estimated reaching approximately 1.4 times the CO_2 concentration levels in 1994 by the end of the 21st century, if CO_2 emissions were maintained at 1994 levels, the rise in global average surface air temperature from 1 to 3.5 ^oC and the rise in sea level from 15 to 95cm by 2100 relative to 1990. IPCC Second Assessment Report estimated also stabilization scenarios that assumes policy measures are enacted which begin to reduce CO_2 emissions in the year 2000 relative to business as usual with eventual stabilization of the CO_2 concentration at 550 PPM by 2150 (current CO_2 concentrations are about 360 PPM).

(2) Global passenger air travel, as measured in RPK, is projected to grow by 3.1 to 4.7% per year in average between 1990 and 2050, whereas total aviation fuel use (CO_2 emissions) is projected to increase by 1.7 to 3.8% per year.

(3) The range of increase in total aviation carbon dioxide emission to 2050 would be 2.6 to 11 times the value in 1992.

(4) Emissions of carbon dioxide by aircraft were about 2% of anthropogenic carbon dioxide emissions in 1992 and will be 3% of the projected total anthropogenic Carbon dioxide emissions in 2050.The best estimate of the radioactive forcing, The perturbation to the energy balance of the earth-atmosphere system, in 1992 by aircraft is about 3.5% of the total radioactive forcing by all anthropogenic activities. Radioactive forcing by aircraft in 2050 will be about 5% of the radioactive forcing by all anthropogenic activities.(the effects of possible changes in cirrus clouds is not included)

(5) Over the period from 1992 to 2050, the overall radioactive forcing by aircraft (excluding that from cirrus clouds) is a factor of 2 to 4 larger than the forcing by aircraft carbon dioxide alone. The overall radioactive forcing for the sum of all human activities is estimated to be at most a factor of 1.5 larger than that of carbon dioxide alone.

(6) CO_2: The range of increase in aviation emissions to 2050 would be 1.6 to 10 times the value in 1992.

(7) NOx: The NOx emissions from subsonic aircraft in 1992 are estimated to have increased ozone (O_3) concentrations at cruise altitudes in northern mid-latitudes. Aircraft NOx emissions are expected to decrease the concentration of Methane (CH_4) that are global in extent. Global average radioactive forcing are of similar magnitude and opposite in sign, but the net regional radioactive effects are not cancelled.

(8) Water vapor (H_2O): Water vapor is a greenhouse gas. For subsonic aircraft this effect is smaller than those of other aircraft emissions such as carbon dioxide and NOx. For high speed civil transport (HSCT) aircraft, although there is considerable uncertainty, additional radioactive forcing due to accumulation of stratospheric water vapor is estimated as supersonic aircraft consume more than twice the fuel per passenger-km.

(9) Contrails: Contrails are triggered from the water vapor emitted by aircraft and their optical properties depend on the particles emitted or formed in the aircraft plume and on the ambient atmospheric conditions. Contrails tend to warm the Earth's surface, similar to thin high clouds. In 1992, aircraft line-shaped contrails are estimated to cover about 0.1% of the Earth's surface on an annually averaged basis with larger regional values. The contrail cover is projected to grow to 0.5% by 2050. The radioactive effect of contrails is similar to that of CO_2 and O_3, but still uncertain.

(10) Cirrus Clouds: Extensive cirrus clouds have been observed to develop after the formation of persistent contrails. The mechanisms associated with increases in cirrus cover are not well understood and need further investigation. An increase in cirrus cloud cover tends to warm the Earth's surface.

(11) Sulfate (Sox) and Soot Aerosols: The aerosol mass concentrations in 1992 resulting from aircraft are small relative to those caused by surface sources. Increase in soot tends to warm while increases in sulfate tend to cool the Earth's surface. The direct radioactive forcing is small compared to those of other aircraft emissions.

(12) Impacts of Supersonic Aviation: Supersonic aircraft consume more than twice the fuel per passenger-km compared to subsonic aircraft. The radioactive forcing of civil supersonic aircraft is estimated to be about a factor of 5 larger than that of the displaced subsonic aircraft. The addition of a fleet of civil supersonic aircraft is assumed to begin operation in the year of 2015 and grow to a maximum of 1,000 air craft by the year of 2040, which is projected to add a further 40% Increase of radioactive forcing. Most of this additional forcing is due to Accumulation of stratospheric water vapor.

(13) Aircraft and Engine Technology Options: A 40 to 50% improvement in fuel efficiency is projected by 2050. The typical aircraft and engine life expectancy, 25 to 35 years, have to be taken into account when assessing the Improvement rate. (Substantial aircraft and engine technology advances are already incorporated the aircraft emissions scenarios used for climate change calculations)

(14) Operational Options: Improvement in air traffic management (ATM) and other operational procedures could reduce aviation fuel burn by between 8 and 18% (The Air traffic management improvements are already incorporated in the aircraft emissions scenarios used for climate change calculations). The large majority (6 to 12%) of these reductions comes from ATM improvements which it is anticipated will be fully implemented in the next 20 years.

(15) Regulatory, Economic, and Other Options: Policy options to reduce emissions further include more stringent regulations, environmental levies (charges and taxes), emission trading, modal shift (substitution of aviation by rail and coach) and so on. Some of these approaches have not been fully investigated or tested in aviation and their outcomes are uncertain.

2. Important elements of "Kyoto Protocol"

(1) Greenhouse gases of concern: Six types (CO_2、CH_4、N_2O、HFC、PFC、SF_6)

(2) Target year/period: First commitment period is for five years from 2008 to 2012

(3) Quantified targets: At least 5% reduction from 1990 levels for total Annex I countries' emissions in carbon dioxide equivalent (Japan-6%, EU-8%, US-withdrew)

(4) Incorporation of carbon sinks: Limited to the sinks from reforestation after 1990

(5) Kyoto Mechanisms:

(i) Joint Implementation by Annex I countries: Allows joint implementation of projects between Annex 1 countries.

(ii) Emissions Trading: Allowed between Annex I countries

(iii) Clean Development Mechanism (CDM): Designed to provide aide to non-Annex I countries, and to support Annex I countries' efforts to comply with targets

(6) Bubble: Allow the bubble (EU) if legal responsibility relationship is specified

(7) Banking and borrowing: Quantity of excess reduction can be forwarded to the next commitment period.

(8) Does not allow borrowing (insufficient reduction quantity to be advanced from the next commitment period)

(9) Condition of Kyoto Protocol's entry into force: After ratified by 55 or more Parties to the Convention (however, the total emissions quantity of ratified Annex I countries must be 55% or more of the total emissions quantity of Annex I countries), enter into force 90 days later.

3. ANA/ANK/AJX/NCA: Subsonic jet aircraft introduction, starting years and retirement years

Aircraft types	Introduction year	Retirement completion year (planned)
B727-200	1969	1990
B737-200	1969	1992 (*)
L1011	1974	1995
B747SR	1979	(planned at the end of fiscal 2006)
B767-200	1983	(planned at the end of fiscal 2006)
B747F (NCA)	1984	-
B747LR	1986	(planned at the end of fiscal 2006)
B767-300(AJX)	1987	-
B737-400 (ANK)	1990	(Retirement plan from 2005)
B747-400	1990	-
A320	1991	(Retirement plan from 2005)
B737-500 (ANK)	1995	(Retirement plan from 2005)
B777-200	1996	-
A321	1998	(planned at the end of fiscal 2006)
B777-300	1998	-

(*) ANK's B737-200 fleet is planned to retire in 2000.

Message from AGP Corp. (Airport Ground Power Supply Corporation)

Our company provides ground power unit service to parked aircraft for electric power and air-conditioning at the airports of Haneda, Narita, Osaka, Kansai, Chitose, Fukuoka, Okinawa and Hiroshima, enabling aircraft to operate on the ground without using their APU. Through the use of our services, ANA has reduced CO_2 emissions of 80,000 tons in CO_2 equivalent per year (which is equivalent to 30,000 kl jet fuel or 1050 round trips between Tokyo and Sapporo (Chitose)). With closer coordination between crews and maintenance workers, ANA has higher GPU usage rate than other airlines, demonstrating their efforts in global warming measures.

Chapter 3　Air Pollution

1. ANA's Activities Related to Air Pollution

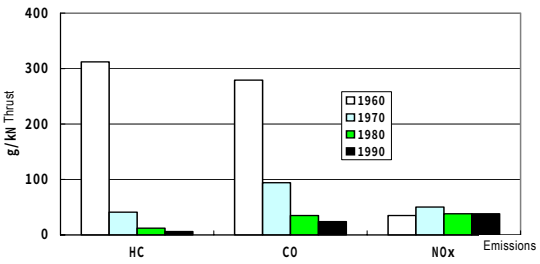
ANA's activities connected to air pollution include mainly (1) exhaust from aircraft, (2) exhaust from ground vehicles, and (3) volatile gas emissions during the painting of aircraft exteriors.

(1)　Reduction of exhaust from aircraft

(i)　Use of aircraft with fewer emissions

As the most effective method to reduce hazardous material emissions from aircraft, ANA has actively introduced new aircraft equipped with new and improved engines, and achieved significant emissions reductions over the past 20 years　(Fig. 3-1).　As shown in this figure, HC and CO emissions have been reduced considerably over the past 30 years, but NOx has not been reduced to as great an extent.　This is because pressure and temperatures in combustion chambers have been raised in order to improve the combustion efficiency of jet engines.

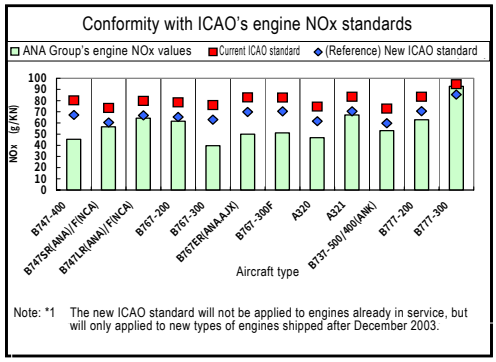
Emissions per unit thrust in landing/takeoff cycle (LTO) determined by ICAO (International Civil Aviation Organization)



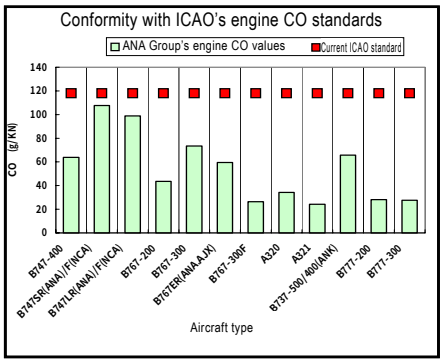
Emissions of ANA Group's fleet and ICAO standards

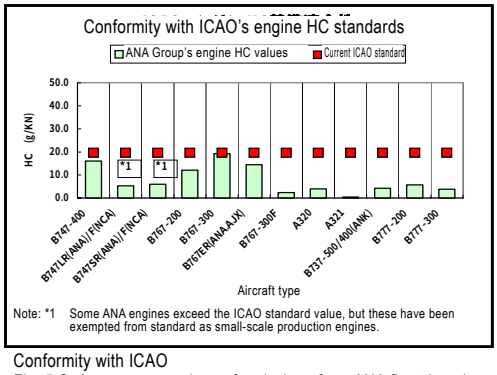
Fig. 3-1

Fig. 5-2

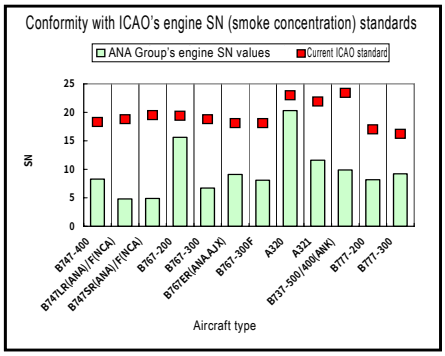


Note: *1　The new ICAO standard will not be applied to engines already in service, but will only applied to new types of engines shipped after December 2003.





Note: *1　Some ANA engines exceed the ICAO standard value, but these have been exempted from standard as small-scale production engines.



Conformity with ICAO

Fig. 5-2 shows a comparison of emissions from ANA fleets' engines with ICAO standards.　Engines currently in service at ANA cleared ICAO standards, except for a small number of small-scale production engines, which will be retired by fiscal year 2006. ICAO aims to further reinforce NOx emissions standards by 2006, and plans "to strengthen the new standards currently on schedule by 5-20% for new type of engines to be approved after 2010-2014."

Engine emissions during ICAO's LTO cycle for fiscal 2002

(Unit: tons)

	ANA	ANA Group (Incl. ANK, AJX and NCA)
NOx (nitrogen oxide)	53,000	65,000
HC (hydrocarbons)	11,000	12,000
CO (carbon monoxide)	53,000	64,000

(ii) Improvements in operations

As measures to control emissions in operations, ANA has implemented various approaches including the maximum shortening of engine operation time, decreasing auxiliary power unit (APU) use by utilizing ground facilities, shortening engine test runs on the ground by improving maintenance works, and reducing actual flight training and ground test flying through the use of simulators.

(2) Promotion of Exhaust Reduction Measures (NOx and SPM) for Airport Ground Vehicles

The ANA Group uses approximately 2000 automobiles of various types (ground service equipment vehicles: airport handling cars, towing cars, power unit cars, maintenance crew vehicles, forklifts, etc.) in domestic airports in Japan, and has made efforts to introduce lower pollution cars or to update our automobile fleet with the latest vehicles with fewer hazardous emissions. As of March 2003, we have a total of 141 low pollution vehicles (7% of all ground vehicles), including low-emission cars, electric (battery operated) cars, natural gas cars, and hybrid cars.

For driving, ANA also emphasizes the need to stop vehicle idling.

(3) Reduction of volatile gas emissions from painting of aircraft exteriors

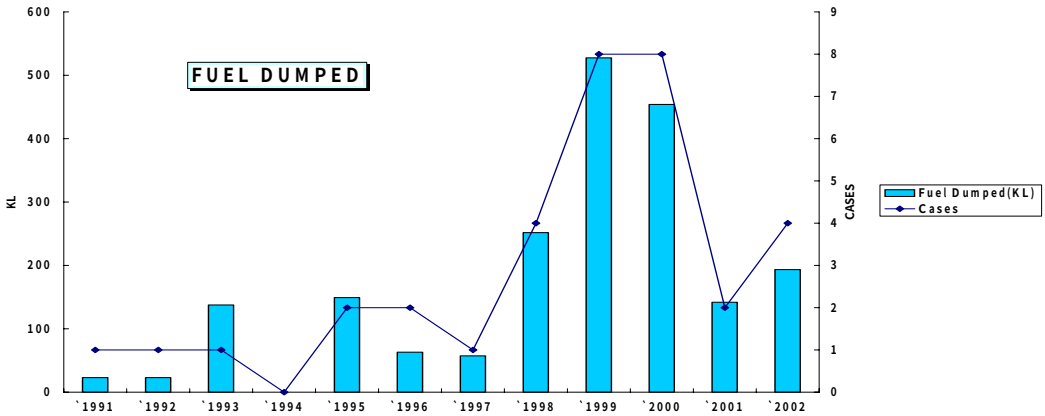
ANA pilot tested the use of low VOC (volatile organic compound) paints for aircraft exteriors, starting with two airplanes (B777) in fiscal year 2002. From fiscal year 2003, we plan to use low VOC paints for about 20 airplanes.

For water quality and soil pollution measures, ANA has introduced a non-methylene chloride, neutral exfoliation agent. In order to promote the use of these paints and agents, ANA Maintenance Corporation, which does maintenance work for ANA's fleet, introduced a heating system to warm all hangars, starting in fiscal year 2002.

(4) Others

Fuel dumping in cases of unexpected landing

It was necessary for ANA fleet to dump fuel four times in fiscal year 2002, resulting in approximately 193 kiloliters of fuel dumped.



Fuel dumping is:

If an airplane needs to make an unexpected landing due to any mechanical malfunction or passengers needing immediate medical care, the aircraft inevitably needs to dump fuel to reduce its weight in order to ensure a safe landing.

Different airports designate specific dumping locations and altitudes, such as over oceans, to avoid fuel dumping over any urban areas. If dumped at higher altitudes, fuel becomes a diffuse mist; ,therefore, it will not directly affect those on the ground below.

2. Aircraft Improvements and Air Pollution

There has been significant progress in research and development on technologies to reduce emissions from aircraft engines with outstanding achievement in the past 30 years, especially in emissions reduction of HC (hydrocarbons), CO (carbon monoxide), and soot. Fig. 3-1 shows the 10-year record from 1980 to 1990 on emissions per thrust unit in the landing/takeoff cycle (LTO) as determined by ICAO. As shown here, HC and CO emissions have been reduced considerably in the past 30 years, but NOx (nitrogen oxide) emissions have not. This is because temperatures and pressures in the combustion chambers were raised to improve the combustion efficiency of engines, which has made it difficult to reduce NOx emissions.

Moreover, to reduce NOx production requires the increase of fuel consumption, thereby creating the question of how to balance this tradeoff. To reduce NOx emissions, various measures have been studied and some already have been applied. These measures include: multi-combustion chambers, pre-mix and sparse combustion system, excess concentration-rapid cooling- and sparse combustion system, pre-mix catalytic combustion system, etc. Regarding the emissions of sulfur oxides (SOx), the emission quantity depends on the type of fuel used. Current jet fuel (kerosene type) has the sulfur content of 0.01% or less (specification is 0.3% or less), so its effect on air pollution (especially regarding acid rain) is minimal.

3. Connection with Ozone Layer Depletion

Ozone depleting substances include fluorocarbons, hydrofluorocarbons, methyl chloroform, tri-chloro-ethane, and carbon tetrachloride. Also nitrogen oxides (NOx) emitted from aircraft are said to increase ozone in the troposphere.

Other than nitrogen oxides emitted from aircraft, ozone depleting substances ANA uses include: (i) those included in the equipment of aircraft itself, (ii) those used during aircraft maintenance, (iii) those used in maintenance vehicles, and (iv) those used in the buildings ANA uses.

For these, ANA promotes the use of alternatives and improvements on the handling of ozone-depleting substances as follows:

1) Those included in the aircraft equipment itself

Aircraft equipment that uses fluorocarbons and halons:

(i) Propellant used in the gas cylinder for rain repellent (drip-proof agent propelled to the front glass of the aircraft in rain) was a designated fluorocarbon solution (CFC113). After it was proved (by Japanese authorities and the US Federal Aviation Agency, except in the case of YS-11 turbo-prop airliner) that the removal of such a system would not cause any aircraft safety problems, ANA disabled the system, and completed this in fiscal year 1998 (YS-11 of the ANK fleet was gradually changed over to the newer DHC-8-300/-400, and all YS-11 planes were retired by August 2003).

(ii) Air chillers (cabin refrigerators to store food items)

ANA completed its change of refrigerant types from designated fluorocarbons (CFC12/CFC113) to an alternative (HFC134a), which is a non-regulated substance. At ANA–commissioned maintenance companies, these alternatives are recovered and recycled.

B747-400D, B777, and A320 have not used such refrigerants from the time of their introduction into the ANA fleet. Presently, ANA has developed ice-chilled carts and is using them in its cabins.

(iii) Water coolers

Water coolers were installed only in B747SR and B767-200 type aircraft at ANA. We have stopped using these water coolers and are in the process of removing them (removal completed for B747SR, and the entire fleet of B767-200 is scheduled to be retired in fiscal year 2003). At present, ANA uses mineral water only.

(iv) Fire extinguishers

Use of fire extinguishers in training exercises

Passenger cabin crew is required to have fire drills at regular intervals to in preparation for potential cabin fires .

For such fire drills, ANA changed its training method after February 1993, and began using dummy extinguishers or water extinguishers instead of halon extinguishers in its practice drills, while also utilizing visual training with video tapes. The dummy extinguishers are designed to have the same or nearly the same shape, weight, handling method, and duration of spouting extinguishing agents as halon extinguishers loaded in a cabin, and also have sufficient fire extinguishing capacity. Through these modifications we avoid the unnecessary release of halons into atmosphere.

Measures taken during the inspection and maintenance of fire extinguishers installed in aircraft

Halon fire extinguishers loaded on engines, cargo rooms and passenger cabins are inspected and maintained regularly by ANA–commissioned companies. By installing halon (1311) recovery equipment at ANA–commissioned maintenance companies, we have established a system for the effective use of halons. Through this measure, we are able to minimize halon gas leakage during maintenance to less than 2%. For Halon 1211, ANA plans to introduce similar equipment in near future.

2) Those used during aircraft maintenance

Designated fluorocarbons and trichloroethane, which were used in aircraft maintenance, were eliminated in 1994, in accordance with the reduction plan prepared in 1990.

For designated fluorocarbons, ANA reduced their use through recycling and through the introduction and use of equipment that recovers cleaning solution, and then shifted to the use of alternative cleaning agents. The use of trichloroethane has been changed to an alkali cleaning solution.

3) Measures for the refrigerant fluorocarbons used for the air-conditioning of motor vehicles

When vehicles are renewed or exchanged, ANA actively promotes the shift to vehicles that use alternative substances. All vehicle maintenance companies of the ANA Group (ANA Motor Services, Osaka Airport Motor Services, and Narita Engineering Services) are licensed to handle fluorocarbon recovery.

4) Measures for halon fire extinguishers used in buildings

Halon fire extinguishers are installed in transformer rooms and computer rooms of ANA buildings. Recently, a new gas fire extinguishing agent has been developed, which can work as an alternative to halon fire extinguishers, and ANA is introducing them in newly-built buildings. In addition, we keep tight management over these extinguishers to avoid any unnecessary releases other than in an emergency.

On Depletion of the Ozone Layer

The ozone layer plays a role in protecting life on the earth by blocking much of the dangerous ultraviolet rays from the sun. In recent years, the ozone layer has been on the decrease globally, which, it is feared, would have a bad effect on human health. The decrease rate is especially high in high latitudes, and a statistically significant rate of decrease is also observed in Sapporo, Japan. The so-called ozone hole is observed over the Antarctic. (Fig.6-1 shows the transition of the ozone hole area observed over the Atlantic.)

The substances contributing to the ozone layer depletion include fluorocarbon, halon, methylchloroform, trichloroethane, and carbon tetrachloride.

Fluorocarbon and halon are extremely stable materials; however, they diffuse to the stratosphere after being emitted to the troposphere, and produce chlorine atoms when decomposed by strong solar ultraviolet radiation. This one chlorine atom reacts with tens of thousands of ozone atoms, which depletes the valuable ozone layer.

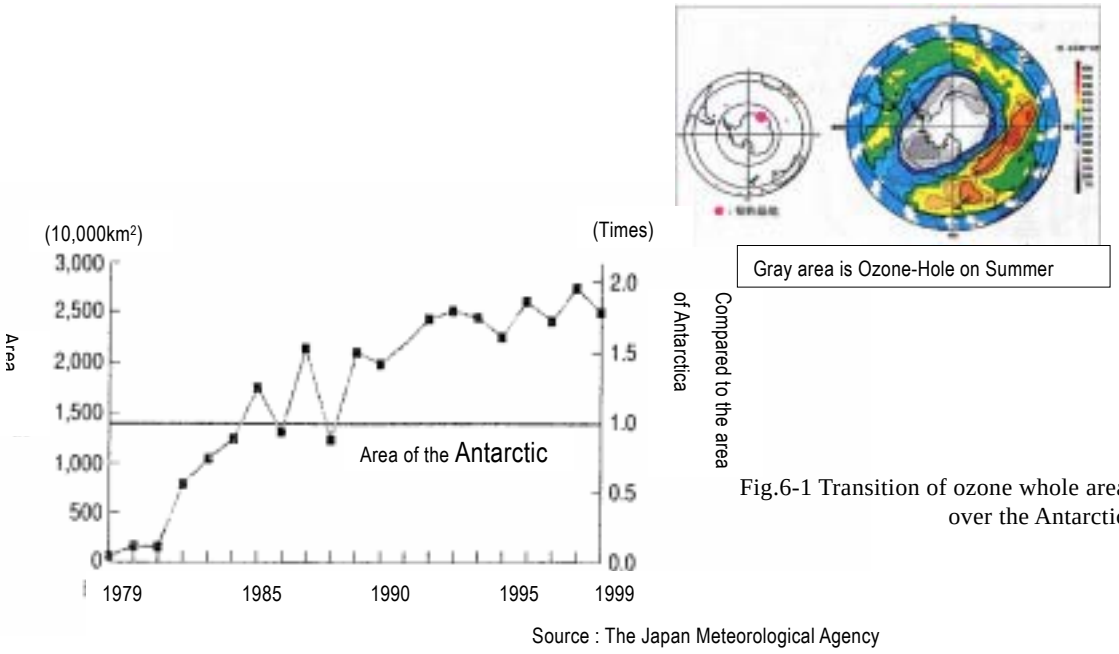


Fig.6-1 Transition of ozone whole area over the Antarctic

Source : The Japan Meteorological Agency

Montreal Protocol

The “Montreal Protocol on Substances that Deplete the Ozone Layer” was adopted in 1987 out of the necessity to protect the ozone layer. Since then, the regulation has been strengthened by revising the protocol five times by 1999, based on new scientific findings. The production of halon was suspended at the end of 1993, and that of chlorofluorocarbon, trichloroethan, and carbon tetrachloride was suspended at the end of 1995. Production of CFC substitutes, too, will be mostly suspended by the end of 2019.

Japan enacted the “Ozone Layer Protection Law” and ratified the Montreal Protocol in 1989.

In the United Nations Environment Program (UNEP) report, it is predicted that the depletion of ozone layer will be at its peak by 2020 and that, by 2050, the ozone density will return to the level before 1980 if all countries observe the protocol.

Chapter 4 Noise

1. Airport noise

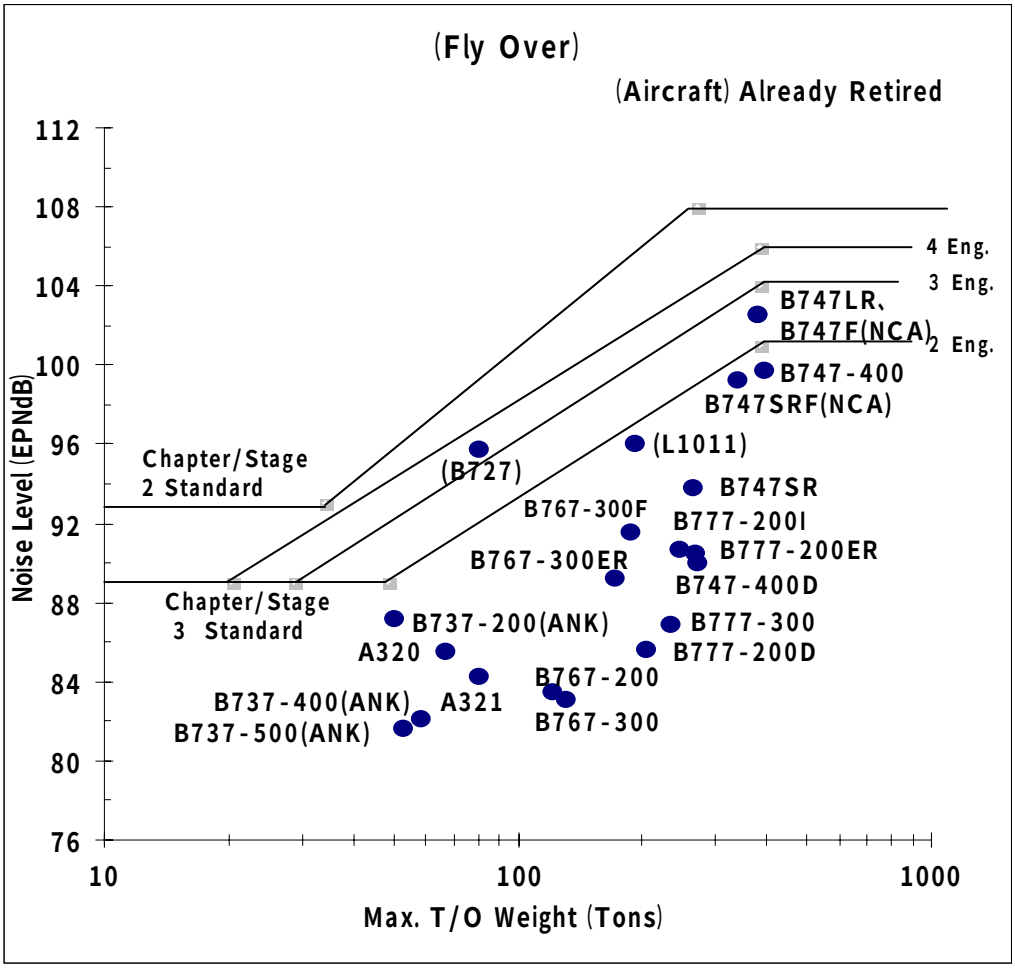
Airport noise includes the following:

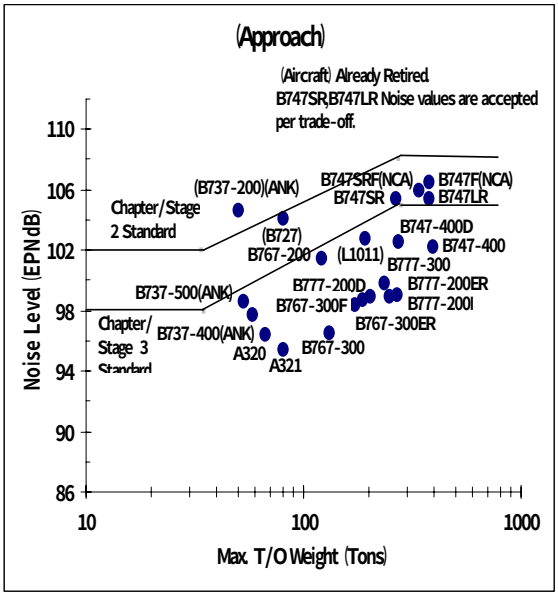
1) Flight noise (engine noise during takeoff and landing)
2) Ground noise
   (i) Aircraft engine operation noise on the ground
   (ii) APU (Auxiliary Power Unit of aircraft) operation noise
   (iii) GPU (Ground Power unit) operation noise
   (iv) Others (ground vehicles, maintenance factories, etc.)

2. Flight noise standards

ICAO (International Civil Aviation Organization) Annex 16 determines the noise standard for semisonic jet airplanes. The initial standards were included in Chapter 2 and "Chapter 3 of Annex 16, and in October 2001 a new and more strict "Chapter 4 standard" was added at the ICAO Plenary Meeting.

1) Chapter 2 standard
   Airplanes conforming to Chapter 2 standard were banned from operation in major countries including Japan starting from April 1, 2002. The ANA Group has already retired every airplane conforming to the Chapter 2 standard.
2) Chapter 3 standard
   This standard was the most strict noise standard before the addition of the new Chapter 4 standard. All ANA airplanes have conformed to the Chapter 3 standard since 1994(refer to Fig. 4-1). The new Chapter 4 standard was adopted at ICAO Plenary in October 2001. Contents of the Chapter 3 standard are shown in Reference 1 at the end of this chapter.
3) Chapter 4 standard
   By ICAO's resolution, the ICAO Annex 16 was revised in March 2002, and the new Chapter 4 standard was added. The new standard will be applicable for the new airplanes after January 1, 2006, and for airplanes currently in service, the application details of the new standard are still in the preparation process, and no approval has been issued to any existing airplanes. Of the ANA group fleet, all airplanes except B747SR, B747LR, and B747F (NCA) will conform to the Chapter 4 standard. ANA plans to retire all B747SR and B747LR airplanes, which do not conforme to the Chapter 4 standard, by the end of fiscal 2006, and will introduce new B777-300 airplanes. The contents of the 33rd ICAO Plenary resolution on the Chapter 4 standard are shown in the Reference page at the end of this chapter.





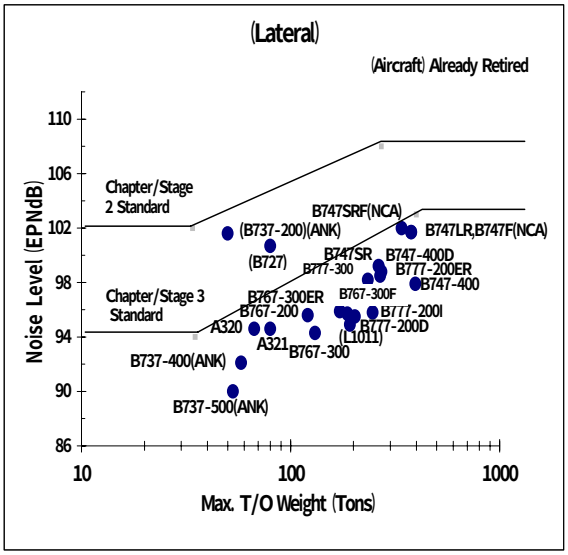


Fig.4-1 ANA Group Fleet Noise Level and ICAO Standards (Chapter 3)

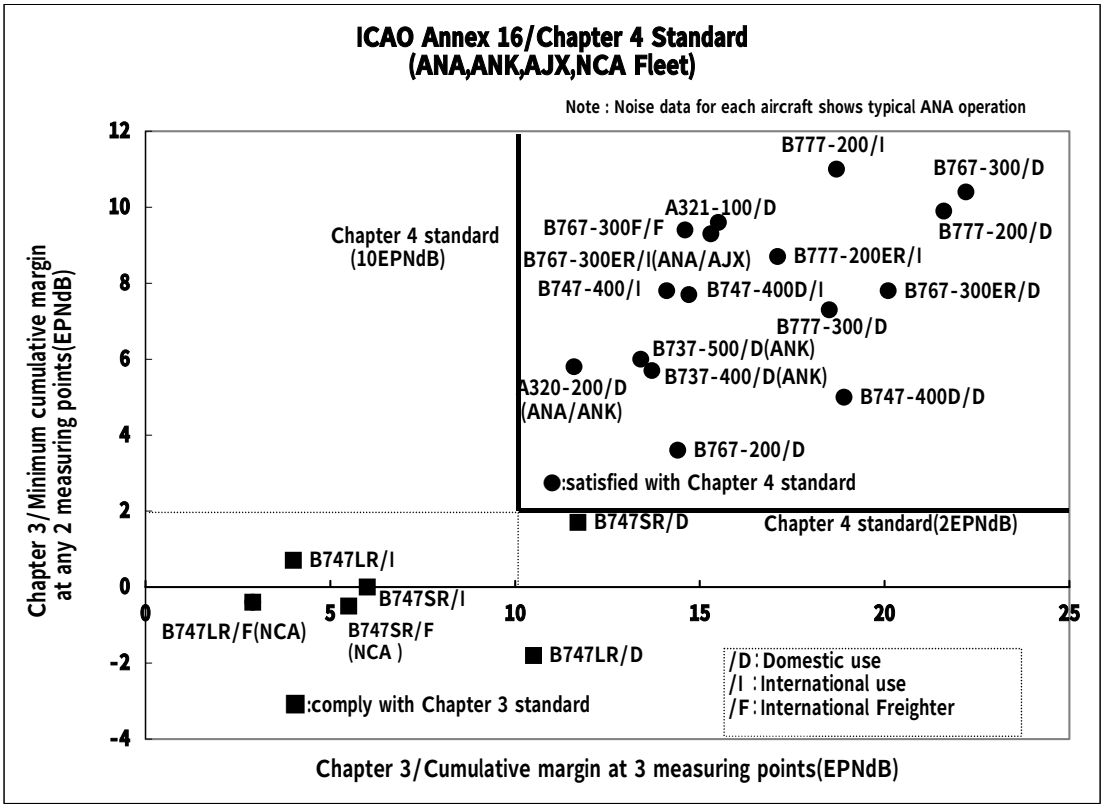


Fig.4-2 ANA Group Fleet Noise Level and ICAO Standards (Chapter 4)

(2) Change in Noise Contour

The area influenced by the same noise level has been reduced with the introduction of new quieter aircraft. (Refer to Figure 2-3).

ANA has been participating in "Aircraft Noise Issue Sub-committee" and its working group that are formed by the government and the people combination, and continuing the review work to improve the accuracy of the noise-forecast program.

(3) Balanced approach / No phase-out of Chapter 3 Aircraft

ICAO Assembly/33 in 2001 adopted following conclusions.

(i) New Standard is intended for certification purposes only and is not intended to be used as a basis for operational restrictions

(ii) The results of the cost/benefit analyses conducted do not support general phase-out of Chapter 3 aircraft in the non-exempt regions

(iii) The four elements of the balanced programme had to be applied on an airport-by-airport basis

- Source noise reduction
- Land-use management
- Noise abatement procedure
- Noise mitigation measures

(iv) The results of the cost/benefit analyses conducted do not support any regional phase-out

(v) Operating restrictions should be considered under the ICAO balanced programme of noise mitigation and there is a need for further work on ICAO framework conditions of operating restrictions as part of the ICAO balanced programme

Aircraft Noise Contour Footprint (Comparison of noise contour)

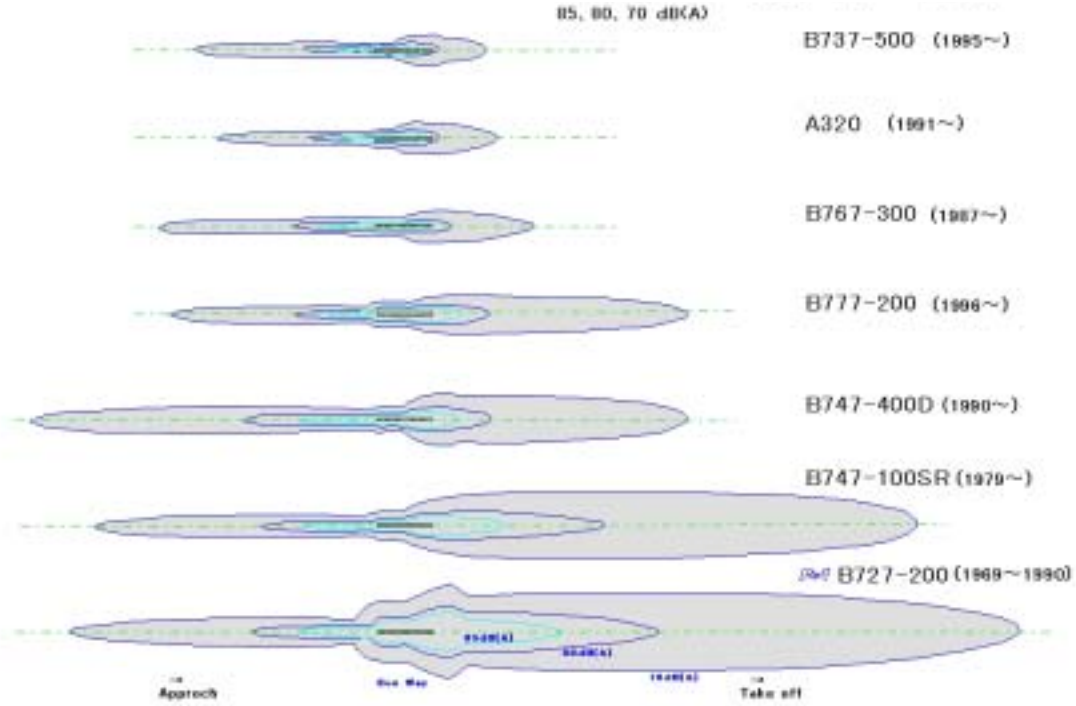


Fig. 4-3 Comparison of noise contour by aircraft type

3. ANA's noise abatement procedures

1) Introduction of noise abatement flying procedures

ANA introduced its noise abatement procedures based on the review by the "Committee to Promote Noise Abatement Operation Procedures," jointly established by JCAB and airlines in 1975. The procedures have been improved and are still in use today.

	Procedure	Description	Airport
Takeoff	Steepest climb procedure	Continue a steeper takeoff ascent to a higher altitude than usual (to 3000 ft.), so as to keep noise contained to the airport region as much as possible, while controlling noise by attaining high altitude in residential areas (refer to the figure)	All airports of Japan
Landing	Delayed flap-down approach procedure	Delay flap-down and landing-gear-down operations to reduce air resistance to the airframe, so as to decrease engine thrust requirement, thereby reducing noise.	Almost every airport in Japan
	Low flap angle landing procedure	Set smaller flap angle for use during final approach to reduce air resistance to the airframe, so as to decrease engine thrust requirement, thereby reducing noise	Airports with longer runway length
Landing and takeoff	Preferential runway procedure	If one side of runway does not have a residential area, then perform takeoff and landing in the preferred direction, as long as wind direction and speed permits(refer to the figure)	Haneda, Matsuyama, Sendai, etc.
	Preferential flight path procedure	In the airport vicinity (lower altitude), select flight paths that circumvent residential areas as much as possible by turning, or that passe over rivers (refer to the figure).	Haneda, Narita, Itami, Nagoya, Sendai, etc.
	V-NAV approach continuous descent procedure	During descent, maintain higher altitude until the vicinity of airport, then continuously descend, so as to control the changes in engine thrust, thereby abating noise. This procedure can save fuel as well (refer to the figure).	New Chitose
	FMS/LLZ flight procedure	Use FMS/LLZ/RNAV in the airport vicinity and fly while avoiding residential areas and shortening flight path. In the case of late night landing in Haneda, avoid passing through Kisarazu (land area), and approach by taking a short cut over the ocean.	Haneda, Frankfurt, Paris, Bangkok, etc.

ANA adopted the FMS/LLZ procedure in 1999 for late night flights to Haneda Airport, and started to operate the V-NAV approach procedure at New Chitose Airport in 2002. We plan to expand the use of these procedures in the future.

2) Kansai International Airport

After the opening of the Kansai International Airport, ANA used the airspace over Kushimoto for its Kansai to Haneda route, but starting in December 1998, it became possible to use a shorter flight path over Suzuka Mountains, shortening the flight time by about six minutes.
In June 2001, Kansai International Airport Corporation issued its "Environmental Management Plan for Kansai International Airport," which aims to make the airport friendly to people and nature, while minimizing the environmental impact on Osaka Bay and its vicinity. In 2003, it issued a notice to airmen (Notam) advising airlines to halt APU operations when parked on the ground, as in the case of Narita Airport.
The airport is building a new B Runway, with a plan to start usage from 2007.

3) Osaka International Airport (Itami)

It was concluded that noise has been significantly reduced at Kansai International Airport through the introduction of low noise jets, the distribution of functions to Kansai International Airport, and the abatement of landing noise, and in March 1998, the Ministry of Transportation presented a proposal to review Osaka International Airport's zone for noise abatement measures. Later, in April 2000, the zone for noise abatement measures under the Law of Aircraft Noise Abatement was reduced. Today the number of flights has reached the maximum level as part of the Plan of Noise Abatement Measures; therefore, measurement and confirmation of noise is scheduled in the latter half of 2003.

4) Tokyo International Airport (Haneda)

Due to the start of the new C runway use in March 1997, noise levels in the Haneda Airport region were greatly improved. Based on the result, Haneda Airport became a 24-hour airport starting in July 1997. In March 2000, a new B runway started being used, thereby completing the plan to Shift A, B, and C runways offshore for noise abatement. Starting February 2001, the operation of late night international charter flights was allowed, and ANA started the operation of such flights. At present, Haneda has a plan to construct a new runway for side winds at the mouth of the Tama River.

5) Narita Airport

A 2180-meter temporary parallel runway was built at the end of November 2001, and it started being used in April 2002. Using this runway, ANA has increased its services for short-distance international flights as well as domestic flights, using mid-range aircraft.

4. Ground noise

1) Osaka International Airport

While ANA built noise-blocking walls in 1997, for its engine test runs, ANA still makes every effort to shorten its test operation times and high power output operation times.
For APU, we try to shorten our operation time, and use GPU(ground power units) such as cars with low-noise type for nighttime maintenance.
For further reduction of ground noise, a new engine test run facility by JCAB was built with large- scale noise blocking walls, and started operation in 2003. Because of this, ANA's noise blocking walls were closed down.

New engine test run facility (white building at the back), and ANA's noise blocking facility (in red and white) which has been in use for 30 years.

(2) New Tokyo International Airport (Narita)

(i) With the beginning of the operation of terminal 2, ANA consider an influence over the area near taxiway, and voluntarily refrain from operating APU at the time of ramp-in and ramp-out. As for our operation of APU, APU OFF operation has been our standard since 1992 from the viewpoint of ramp noise reduction according to a request from NAA as well as from the viewpoint of the fuel cut down (the reduction of CO_2 emission). When the repair of terminal 1 was completed, NAA notified all the airlines "to implement APU OFF operation as much as possible from April 1, 1998" with a document from the viewpoint of the global warming prevention.

(ii) The hangar type noise suppression facility (engine ground running noise) for the south wind was constructed by a joint investment of ANA, JAL, and NAA in April 1999, which is a part of the countermeasures on the aircraft noise.

It is expected to be more efficient than the existing facilities for the north wind, to be possible to correspond to all kinds of airplanes, to be possible to operate for 24 hours, and to contribute to the region environmentally. The modification of facility to resist the crosswind and to improve the performance was carried out in March 2000. Full-dress operation started from April 2001. Engine run-up for maintenance purpose during midnight and early morning (22:00 to 06:00) has to be done in this facility.

Hangar type noise suppression facility (Narita)

(3) Tokyo International Airport (Haneda)

(i) New run-up area was established in offshore area of Haneda and started its operation from January 1994. The noise problem to the area was considerably eased by the operation of 7 spots in total.

(ii) ANA built the new engine test cell in October 1995, which is considered to restrain low frequency noise, and also built an APU run-up facility aside in April 1998.

ANA Facilities (Haneda Airport)

(4) Countermeasure on Noise of Maintenance Facilities and Vehicles

ANA has been carrying forward the renewal of our vehicles to low noise type and all of the AC power supply cars ANA possess are low noise type. Also, ANA introduced 1 low-noise type de/anti-icing vehicle with blower by 2001, and 5 in 2003.

Low-noise type AC Electrical Power Supply Car

Low-noise type de/anti-icing vehicle (New Chitose Airport)

[Note]

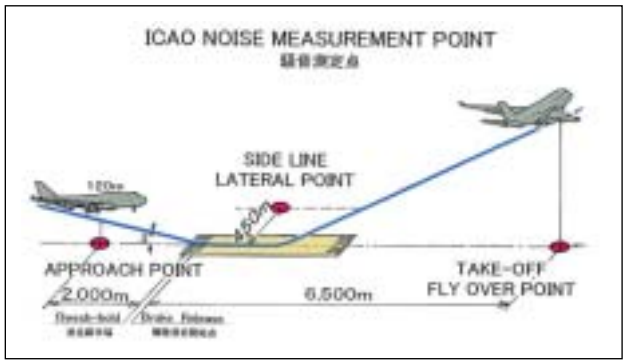
1. ICAO Chapter 3 Noise Standard

Three Measurement Points

(1) Lateral reference noise measurement point: 450m from the runway center line

(2) Flyover reference noise measurement point: 6.5km from the start of roll

(3) Approach reference noise measurement point: 2.0km from the threshold



2. New ICAO Chapter 4 Noise Standard (ICAO Assembly Resolution)

(1) A cumulative margin of 10 dB over current Chapter 3 levels

(2) The sum of the improvements at any two measurement points shall be at least 2 dB

(3) No trade-offs are permitted

(4) The applicability date is 01 January 2006

(5) New noise standard is only intended for certification purposes and not for the purpose of new operational restrictions such as phase-outs

(6) Specific consideration for exemptions from new operating restrictions for developing countries

Chapter 5　Waste and recycling

1. Aviation and waste

Waste from aviation can be classified into the following three categories:

(i)　Waste or effluent (waste water) from aircraft maintenance works at factories

(ii)　Waste from aircraft cabins

(iii)　Waste from offices

2. ANA's current situation concerning waste

ANA's actual waste production in fiscal year 2002 was as follows:

(Unit: tons)

	Fiscal Year 2001	Fiscal Year 2002
Industrial waste	813	915
General waste	9,988	6,160
(Incl. cabin waste)	(5,293)	(4,342)
Sewage	81,274	403493
(Incl. effluent from factories)	(25,191)	(26,727)
(Incl. waste water from galleys)	-	(18,504)

Note: Due to increased data from group companies for fiscal year 2002, a simple comparison between 2001 and 2002 cannot be made.

3. ANA's measures for waste reduction and recycling

ANA and ANA Group companies have adopted the following measures to reduce waste and to promote recycling.

(Reduction of industrial waste)

- Change the method of measuring the weight and balance of aircraft (to measure without the disposal of loaded fuels)
- Recycle and reuse aircraft tires (re-mold and reuse 6 times on maximum)
- Recycle and sell cut-off pieces from maintenance works (4.362 million yen in fiscal year 2002)
- Repair and reuse aircraft equipment (development of repair methods)
- Recycle and reuse thinners, MEK, etc. from aircraft painting works (at ANAM Co. and Techno Aviation Co.)
- Recycle and reuse activated carbons used for air-conditioning equipment and for the treatment of semi-treated water at hangars
- Cleaning engine parts with ultra-pressurized water (to reduce the use of chemical agents)
- Change aircraft re-painting method (since fiscal year 2001, use of the overcoat method without peeling)
- Recycle and reuse appliances and furniture upon the moving of head office from Haneda to Shiodome

(Waste water treatment)

- Treat rainwater and galley waste water for use as semi-treated water (treated 18500 tons of water at two facilities in fiscal year 2002)
- Introduce non- or low-pollution de-icing and anti-freezing agents (shifted from ethylene glycol to propylene glycol, since 1997)

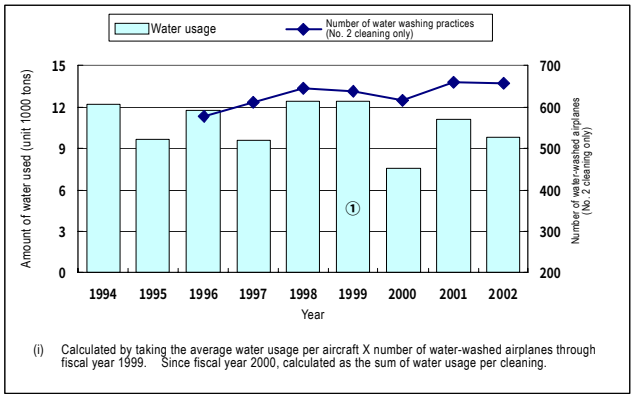
(Reduction of general waste)

- Recycling of air-ticket stubs with magnetic tapes through solution processing (more than 100 tons/year)
- Sorting and recovery of cabin waste (sorting bottles and cans at Kansai Airport Branch and other offices)
- (ANA: Installed waste compactors on the international flight aircraft, such as B747-400 and B777)

4. Measures for water cleaning, de-icing, and anti-freezing works on aircraft.

(i) Washing of aircraft and the use of water

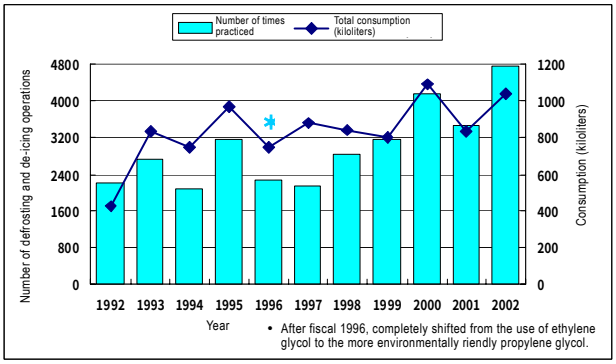
The graph to the right shows the amount of water wash used at the aircraft cleaning areas and hangars of Haneda and Narita Airports. All the water used for cleaning is treated properly and then discharged to public sewage. (For fiscal year 2002, such cleaning was not done at the hangars of Kansai Airport.)



(i) Calculated by taking the average water usage per aircraft X number of water-washed airplanes through fiscal year 1999. Since fiscal year 2000, calculated as the sum of water usage per cleaning.

(ii) Anti-freezing and de-icing works on aircraft and anti-freezing and de-icing agents

For safety reasons, aircraft cannot takeoff if any snow or ice is adhered to the wings, control surface, fuselage, etc. Aircraft can take off only after snow has been blown off using large amounts of hot water (or compressed air in the case of dry, midwinter snow at Chitose Airport), followed by coating with an anti-freezing agent.



• After fiscal 1996, completely shifted from the use of ethylene glycol to the more environmentally riendly propylene glycol.

The ANA Group has completely shifted its use of anti-freezing agent to propylene glycol (an environmentally friendly substitute that is not subject to the Japanese PRTR Law), and has made efforts to develop better equipment and to improve work procedures so as to reduce the amount of anti-freezing agent used.

5. Compliance with the PRTR Law (Pollutant release and transfer register)

In fiscal year 2001, ANA participated in a project to prepare the “Manual for the Calculation of PRTR Emissions,” executed by the Ministry of Economy, Trade and Industry/Society of Chemical Engineers, along with the Scheduled Airlines Association of Japan. Also, ANA held the “Seminar to Explain the Enforcement of the PRTR Law to Airline Industries” at ANA Hall with the cooperation of the Tokyo Metropolitan Office, and cooperated in the “Pre-survey and Pilot Projects under the PRTR Law,” held by the Ministry of Environment and the Tokyo Metropolitan Office.

Based on these activities, ANA developed an inter-company management and reporting system in fiscal year 2001, redeveloped the existing system to collect and disseminate Material Safety Data Sheets (MSDS), and introduced a search function in the inter-company LAN to access the latest information.

PRTR substances at ANA are related to aircraft maintenance, and consist of 45 substances used in about 500 different products. The amount of such substances used in each product, however, is extremely small, and does not amount to the level for which the PRTR Law requires reporting, i.e., five tons or more per year per workplace (0.5 ton or more in the case of some substances). Therefore, no report was submitted by any of ANA’s workplaces.

Among ANA Group companies, however, ANA Maintenance Corporation (Osaka Prefecture), which does painting and heavy maintenance work on aircraft, submitted a report on dichloromethane (PRTR No. 145), and ANA Nagasaki Engineering, which does the plating of aircraft landing gear, reported on trichloroethylene (No. 211).

MEK (Methyl ethyl ketone: regulated by Tokyo Metropolitan Office Ordinance) is not a PRTR substance but is used in large amounts for painting and cleaning processes related to aircraft maintenance. ANA Aircraft Maintenance Co. and ANA Techno Aviation Co. are researching potential alternatives.

PRTR substances and their usage at ANA

Designated PRTR substances	JPN PRTR Law No.	CAS No.	Major application (materials)
Tributyl phosphate	354	126-73-8	Hydraulic oil
Poly-octylphenyl ether	308	9036-19-5	Cleaning agent
Toluene	227	108-88-3	Paint, thinner, sealant
Xylene	63	1330-20-7	Paint, thinner, sealant
Manganese	311	1313-13-9 etc.	Parts cleaning agent, sealant
Poly nonyl phenyl ether	309	9016-45-9	Parts cleaning agent
Cellosorbacetate	101	111-15-9	Thinner
Ethyl benzene	40	100-41-4	Paint
Chromium (VI) compounds	69	7789-00-6 etc.	Paint
Bisphenol-A di-glycedine ether	30	25068-38-6	Sealant

Major PRTR substances and their applications at ANA Group companies (other than the above)

Designated PRTR substances	JPN PRTR Law No.	CAS No.	Major application (materials)
Dichloromethane	145	75-09/2	Paint peeling agent
Trichloroethylene	211	79-01-6	Pre-plating cleaning
Sodium cyanide	108	143-33-9	Plating
Ethylene glycol	43	107-21-1	Aircraft cleaning agent

6. Green purchasing

Since July 2002, ANA has worked to promote green purchasing through the introduction of its e-purchasing system for office supplies and copy paper, using an intranet LAN.
As an addition to the above system, ANA has adopted and implemented a unique system to internally reuse files through an aggregate collection method of files no longer in use at each of its offices.
For the year starting from summer 2002, green purchasing made up 59% of all purchasing done through these systems.
In the future, ANA will promote the use of these systems within the company, while extending the systems to include ANA Group companies, like the ANK head office that has already started applying these systems since March 2003.

Chapter 6 Social contributions

The ANA Group adopts the following measures as part of its social contribution activities, utilizing the Group's unique position as part of the air transportation industry.

Items	Description
Donation of funds for an elementary school in China	In September 2002, ANA donated funds for an elementary school in Hebei Province of China. This was the second donation ANA made for a school in China since its first in 1997, and commemorated the 15th anniversary of ANA's first flight service to China. It was built in hopes to deepen ANA's amicable relationship with China.
Lily of the Valley Events	For the 47th time since 1956, ANA airlifted a total of 20,000 bundles of lily of the valley from Hokkaido to 32 airports throughout Japan. ANA cabin attendants and grand hostesses hand-delivered these flowers and visited 43 Red Cross hospitals in 34 prefectures.
Red Feather Charity (Central Community Chest of Japan, under United Way International)	ANA transported red feathers to 39 regions in Japan, as part of "red feather - first mail by air" program and cooperated in fundraising activities. This is the 41st time since 1962 that ANA has participated in transporting red feathers. On October 1, 2002, ANA received a letter of appreciation from the Central Community Chest of Japan for ANA's past cooperation. ANA's president, Mr. Ohashi, and ANK's president, Mr. Masumoto, participated in their street fundraising activities.
Green Feather Charity Campaign	ANA set up charity boxes at its domestic Cabin Service Departments and Sections in Japan, cabin attendants participated in fundraising activities, and employees wore green feathers on their uniforms during flight service.
Charity fund raising activities in aircraft cabins	ANA cooperates with UNICEF's "Change for Good" fundraising activities in aircraft cabins of flights arriving from the USA (since 1998).
Charity bazaar	ANA donated funds, cabin tableware, and cabin utilities to Japan Red Cross, guide dog associations, nursing homes in Japan and abroad, and other social welfare entities, including funds collected at the ANA Open Golf Tournament, and charity bazaars held at offices in Japan and abroad.
Sugiura Chiune Program	Cooperation with the Chiune Sugiura Scholarship Program in New York.
Junior Meeting on the Environment	Cooperation with "Junior International Meeting on the Global Environment" held in Japan.
Okazaki Kaheita International Scholarship Foundation (established under ANA's second president)	This Foundation invites students of excellence from countries in Asia with wishes to study in Japanese universities. It was established with ANA's cooperation in 1990, for the purpose of providing assistance, such as scholarships, to Asian students. In fiscal year 2002, 12 students came to Japan under this scholarship program (56 people in total since its establishment).
Aviation classes and tours of aircraft Maintenance Center	ANA conducted tours of its aircraft maintenance centers and airport branches for the general public, students, and foster care facility residents. Haneda MC: 26,349 people for fiscal year 2002 (214,540 people in total since 1993). Narita Plant: 2,207 people in fiscal year 2002 (in cooperation with ANA hotels).

○ Maint. facility tour inquiry: Haneda - Tel no. +81-3-5756-5094, kengaku@ana.co.jp Narita – Tel no. +81-476-32-5120

ANA President, Mr. Ohashi, participating in the Red Feather Charity fundraising activity.

ANA's Blue Sky and Hope Elementary School (ANA Lan-tian Xiwang School) in Hubei Province

Chapter 7　Topics since April 2003

ANA's environmental activities are ongoing.　Below is an outline of recent topics from April to August 2003.

Items	Description
Towards realization of the Ecology Plan	The ANA Group set up its "Ecology Plan," a new five-year plan for environmental management. Its key features include: (i) Global warming counter-measures (ii) Social contribution activities for the environment (picture book contest and reforestation) (iii) Introduction of actual quantified targets for various environmental measures (iv) Reflection of customer opinions in its environmental management (Refer to Chapter 1, ANA's Environmental Activities , for details)
Revision of targets for global warming prevention	ANA announced its new target of 12% reduction from 1990 levels in CO_2 emissions from ANA fleets per available seat-km (ASK) by 2007.　This is an ambitious target, which is 2% above the target set for the airline industry (Scheduled Airlines Association) and accelerates the target year by three years. ANA will take on this challenge through the introduction of newer aircraft and the improvement of operation methods.
International Environmental Picture Book Contest	Held by the ANA Group, the International Environmental Picture Book Contest is ongoing from May 2003 co-hosted by the UNICEF UNESCO and sponsored by the Ministry of Environment. This year's theme is "showing how we care about the environment, nature, living creatures, and natural resources."　The winners will be announced in December 2003.　The grand prize-winning book will be published in Japanese and English, included in the cabin services of ANA flights, and distributed free of charge to kindergartens, school libraries, and other places.
Reforestation activities	The ANA Group will start reforestation projects during the next fiscal year under a 10-year program to plant trees at areas adjacent to various airports in Japan, and airport regions in developing countries to which ANA provides flight services. For this year, ANA test-planted trees near Chitose Airport in June, with about 100 employees volunteering under the co-sponsorship of the Forestry Agency.　(Similar activities are planned for the Chitose, Tokyo and Fukuoka regions for the next year.)
Environment Forum	In July, ANA held its 2nd ANA Environment Forum.　Lectures were presented by the Ministry of Environment,the Forestry Agency, and others, to audiences including 150 people from ANA Group companies (26 companies) and about 30 participants from outside the company.
Japan Building Maintenance Association's Highest Award	Saywa Service Co., an ANA Group company that provides building maintenance in the Tokyo region, received the Golden Award from the Tokyo Building Maintenance Association for its work on the improvement of ANA aircraft maintenance centers in the Haneda region.　This was further recognition of ANA's daily efforts in energy and resource saving activities.
Environmental questionnaire	ANA conducted its annual environmental questionnaire to ANA employees in June, and received 5,457 responses (35% of total employees), confirming the increased environmental awareness of its employees.
Seat cushions made of carbon fibers	In July, ANA installed the world's first carbon fiber seat cushions in B767s, as the material is superior in terms of environmental and safety concerns.　(Jointly developed by ANA engineers, ANA trading Co., and Osaka Gas Co.) These cushions are 100% recyclable, and save aviation fuel consumption by reducing aircraft weight, while also improving safety.

Poster : 1st International Environmental Picture Book Competition


全日空
炭素繊維で新型座席
軽量、再生容易に
大ガス関連会社 共同で開発

Seat cushions made of Carbon fibers (Nikkei Shimbun, August 23, 2003)

Chapter 8
Environmental Protection Efforts at Group Companies

All Nippon Airways Trading Co., Ltd.

Addressing the environment at our trading company

At ANA Trading Co., Ltd., we manage airport shops around the country, and deal as well in aircraft parts, on-board products, electronic parts, agricultural products, paper and pulp products, and hotel-use goods. In addition, we actively deal in environmentally friendly products including carbon fiber materials, recycled materials, and recycled paper and paper from non-timber sources.

A floor made from "new timber" at ANA's headquarters

Working jointly with the environmental technology developer EIN Engineering Co., Ltd., we are working to create general merchandise and product markets based on EIN's environmental technologies. One such example is a new "timber" made from waste wood and waste plastic that can be used in place of natural wood. This new material has a wooden texture, but is water- and rot-resistant and can be collected and pulverized for reuse as raw materials.

In addition, we are working with EIN Engineering Co., Ltd. to revitalize our damaged oceans by restoring and fostering growth of algal beds using technology for seeding and growing algae in artificial algal growth cultures. We are also cooperatively working on water-quality improvement projects, using floats of water-purifying vegetation to return wetlands and streams to their original clean water quality.

In July 2003, B767 seat cushions made from carbon fibers flew the world's skies for the first time. These cushions were developed over several years by ANA's technology wing and Osaka Gas Co., Ltd. and are products with superior environmental and safety characteristics. Environmentally speaking, they are 100% recyclable, eliminating the previous burden of waste disposal and are lightweight, which contributes to reductions in aircraft fuel consumption. In terms of safety, they are highly fire-resistant and release almost no noxious gases in the event of combustion. We expect that in the future these cushions will be used for other forms of transportation in addition to aviation.

ANA Hotels International
(ANA Hotels & Resorts Co., Ltd.)
(ANA Hotel Management Co., Ltd.)

Environmental protection in our hotel operations

The ANA Hotels Group owns and manages 18 hotels in Japan and three overseas.

With the mission of providing our guests with a comfortable room environment, it can be difficult for hotels to implement energy saving measures. Still, our company, which includes employees with training

from the Agency for Natural Resources and Energy in rationalizing energy use and technological surveys, is making efforts to address energy conservation.

During the 2001 fiscal year, our ANA Hotel Tokyo, receiving subsidies from NEDO (New Energy and Industrial Technology Development Organization), carried out large-scale renovations to its facilities, making significant environmental improvements in the process. These improvements were featured in the monthly magazine Sho-Enerugi (Energy Conservation) and were introduced on NHK Television's morning shows Ohayou Nihon and Shutoken Net.

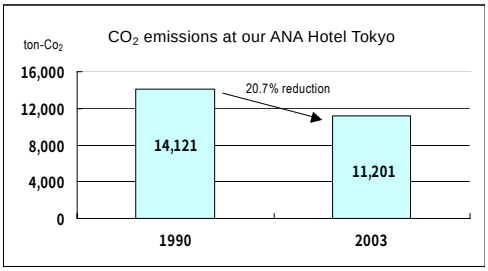
Drawing on our experience with ANA Hotel Tokyo, in fiscal year 2003 we proceeded to perform energy conservation renovations on our ANA Hotels in Hiroshima, Narita, Hakata, and Kanazawa.

Our main hotel energy conservation measures

In order to eliminate unnecessary energy use while maintaining a comfortable room environment, we have introduced 1) inverter controllers and 2) BEMS (Building Energy Management System). Our employment of 3) the PDCA(Plan Do Check Action) cycle in the form of follow-up work and subsequent feedback has also been successful.

Contributions to achievement of COP3 (Kyoto Protocol) standards

As a result of limiting the amount of energy used through the introduction of energy-saving devices and the above mentioned follow-up meetings, our fiscal year 2002 CO_2 emissions showed a 21% decrease as compared to fiscal 1990 (base year) levels.



ANA Aircraft Maintenance Co., Ltd.
ANA Techno Aviation Co., Ltd.

Reduction of the environmental impact of aircraft painting

Since its establishment, ANA Aircraft Maintenance Co., Ltd. has worked as an aircraft maintenance specialist to realize its goal of providing "comprehensive quality" in the form of high quality, low cost, and prompt service, to ANA and other domestic and foreign airlines. In addition to providing maintenance work on a wide range of aircraft, from airliners to helicopters, we also maintain flight simulators for pilot training and produce mock-ups and door trainers for flight attendant training purposes.

Our company addresses various customer needs, including the application of all manner of designs, including paintings and markings for jumbo jets and helicopters. Along with ANA Techno Aviation Co., Ltd., ANA Maintenance performs painting operations on more than 20 jumbo jets per year. We are doing our best to make our enterprises as environmentally sound as possible, by using environmentally friendly paints and by improving our liquid waste disposal measures. Some of these efforts are introduced below.

(1) Paint remover

An aircraft's paint is not only to protect the fuselage from the elements, but is also important in making customers feel good about riding on the plane. In order to keep the paint in the best condition possible, it is necessary to periodically strip the old coat and repaint the aircraft. Though the stripping process

uses paint remover that includes a chlorinated organic solvent (methylene chloride), regulations regarding effluent and air pollution have been strengthened in recent years. We are therefore conducting surveys and considering alternatives to the removal solutions currently used.

We are participating in the development of a new stripping solution that does not include methylene chloride, but is capable of stripping ANA's special weather-proof urethane paint, the ingredients of which include fluorine resin.

(2) Low solvent coatings

A two-component, naturally hardening polyurethane paint containing volatile organic solvents such as xylene, MEK, toluene, and IPA, is used for aircraft coatings. Our efforts to use environmentally friendly, low-solvent coatings have met with significant success. ANAM & ANA continue in cooperation with paint manufacturers to develop new products for use as aircraft fuselage coatings.

(3) Change of finishing agent chemicals

The washing and etching agents used in pre-paint treatment of the fuselage recoating process has relied on chemicals covered by domestic controlled substances laws. However, after spending two years performing various investigations, in fiscal year 2002 we managed to introduce a new surface treatment method employing chemicals that are not subject to regulations.

[Painting a jumbo jet.]

(4) Painting machine

We currently employ the latest high-adhesive, electrostatic airless painting machine, which allows us to reduce atmospheric emissions while reducing the amount of materials used.

(5) Waste water treatment plant

Industrial waste water and fuselage wash water resulting from maintenance work is collected in an underground tank, where the toxic substances are treated appropriately before being released into the public sewage.

(6) Hangar heating facilities

When using environmentally friendly materials for fuselage painting, the work cannot be performed to satisfaction at conventional temperatures. At low temperatures, reactions are slow or absent, resulting in longer time for the stripping and peeling of paint. Furthermore, the paint dries very slowly and may not achieve the durability required. In order to give aircraft a quality coating that is unaffected by temperature over the years, in 2001 we upgraded our facilities so that we can maintain temperatures of 20 degrees C inside our two B747 large-size hangars even in the winter.

ANA Motor Service Co., Ltd.

Efforts of our airport ground support equipment (GSE) vehicle maintenance company

As the ANA Group company specializing in GSE, ANA Motor Service Co., Ltd., maintains vehicles, maint. equipment and airport baggage handling system, and operate gas-stand at Tokyo/Haneda airport. We also deal in and maintain the passenger boarding bridges (PBB) and air cargo containers used at all of the Japanese airports. At the end of December 2002, we established the following environmental protection guidelines, and are working to introduce them to every area of our operations.

(1) In-house measures

- Introduction of low-emission vehicles into the company's vehicle fleet
- Reduction of air pollutant emissions by enforcing idling stops
- Improvement of waste disposal methods, including separation of industrial waste and treatment of waste oil
- Improvement of general waste separation (glass and PET bottles, cans, general waste)
- Conversion of 50% of used documents into recycled paper
- Soliciting ideas for environmental protection from our employees

(GSE Maint. facility, Haneda Airport District)

(2) Business measures

• Sales of low-sulfur diesel fuel

In January 2003, we switched the fueling stands at Haneda Airport to low-sulfur diesel fuel. By promoting the sale of this fuel, we are contributing to the prevention of air pollution by soot.
(As of April 2003 we have switched over completely to low-sulfur diesel fuel.)

• Cleaning up exhaust

We are conducting activities to raise awareness about clean vehicle exhaust by explaining the state of legal regulations and by collecting and introducing information on the latest particulate matter (PM) removal technology to our customers.

- CFC collection

  When performing vehicle maintenance, after receiving the customer's consent, we replace the air conditioner catalyst Freon with CFC substitutes. The Freon is then disposed of appropriately.

(ANA B747-400)

Third Party Opinion of ANA 2003 Environmental Report

Last year, I wrote in my comments to the ANA Environmental Report that major improvements in reporting had occurred, but I do not feel that I can say the same this year. Although ANA has started many important new initiatives in this one year, I do not think that the environmental report reflects these improvements sufficiently.

Peter David Pedersen
Chief Executive,
E-Square Inc.

First, let me point to the important initiatives started in the last year:

- The establishment of an "Ecology Plan 2003/2007" for the ANA Group
- The inclusion of group companies in the scope of reporting
- The introduction of an environmental compliance program
- A pro-active reduction target for the reduction of CO2 emissions: Target for 2007 (as compared to 1990 level) has been set at 12%, while airline industry target is 10%
- The picture book contest "My Blue Sky" involving stakeholders (children)
- The commencement of tree planting at several locations in Japan

These important initiatives answer many of the questions I asked in last year's environmental report, and I feel that this year's report should have focused more clearly on these new and significant actions taken by ANA. Unless you know of these initiatives in advance or read the report very carefully, you might easily miss these important pieces of news.

In future environmental/sustainability reports, I recommend that important new initiatives are highlighted or given more significant coverage for increased reader friendliness.

Here are some suggestions as to how to improve the report as a communication tool:

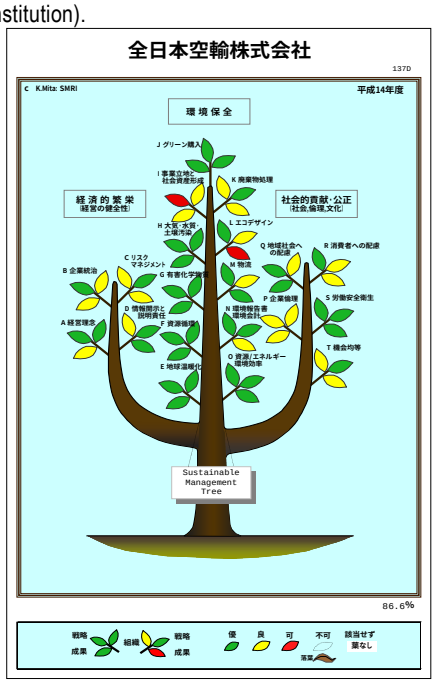
- Better coverage of new items/important changes so that the reader can see how ANA is progressing. This year, much more focus should have been placed on the group-wide environmental 5-year plan, "Ecology Plan 2003/2007".
- More focus on ANA's stakeholders (customers, staff, business partners, airports, ect.). At present it is difficult to get a sense of ANA stakeholders. In particular, the efforts and opinions of ANA staff should be included.

- As a member of the Star Alliance, some focus on ANA's global activities would improve the report. Despite the fact that ANA is a very global company in its nature, the angle of the global corporate citizen is not visible in the present report.

Evaluation of the Sustainable Management Rating Program

Beginning in Fiscal Year 2002, ANA participated in the Sustainable Management Rating Program, run by the Sustainable Management Forum of Japan (a sustainable management rating institution).

This year, the program's first, we were included among the 86 Japanese companies rated as first-class, and we were ranked in the top tier in terms of corporate transparency. As for the company's internal management, we standardized our policies between all departments and in the process learned the importance of the Triple Bottom Line (sound financial management, environmental protection, social consideration). We are planning to participate again in 2003.



The Sustainable Forum of Japan: A non-profit organization composed of Japanese university researchers, corporate executives, citizens and others.

Rating Agency
Sustainable Management Rating Institute

Receiving subsidies from the Ministry of Education, Culture, Sports, Science and Technology, the Forum conducts research towards the establishment of the Sustainable Management Rating Program, with the goal of achieving a global standard.

The rating program consists of twenty items in three main areas, each receiving a rating according to the various colors of a leaf (green, yellow, red and fallen leaves).

In addition, we were ranked 5th of 18 of the world's major airlines by Innovest Co., a US-based international sustainable management rating institute.

(AJX Air Japan B767-300)

Comments from our Readers' Questionnaire

In the last fiscal year, we receive numerous comments from individuals and corporations regarding our report. We thank our readers very much.

Reader's Comment	Our Response
Please clarify the relationship between the targets you set and your Action Plan.	During the 2002 Fiscal Year, we reconsidered and revised our Mid-term Action Plan.
I think you should include more about your environmental actions in the wonderful ANA magazine found in your airplanes.	We included an advertisement for the Environmental Picturebook Competition in our in-flight magazine. We will continue to make efforts along these lines in the future.
There was not enough about waste reduction and recycling. Please give more details.	While our business operations are in compliance, we agree that we need to put more effort into addressing waste management in our airplane cabins.
Please give more attention to the waste generated in the passenger cabin.	
You should address problems of importance to airlines, such as noise pollution, global warming, and air pollution.	Thank you very much. We will strive to keep your comments in mind in the future.
You should include a description of the situation around the world, with a description of your efforts set in that context.	
One gets a sense of the steady efforts your company makes to avoid falling behind the times.	
Your efforts to report honest corporate activities and to improve the environment are evident.	
The report is well written – it is on the same level as the readers and is written in a "homemade," personal style.	
Please continue to write the report in the current simple and "homemade" style.	

ANA's 2002 Environmental Report was introduced in the publication "Environmental Marketing & Business" (published by Sendenkaigi Co.).

" Simplicity"

" Two-color printing, 58 pages. So simple it doesn't even feel like it's 58 pages long. Though they are serious about their efforts to address environmental issues, you can tell from the report that the company would rather not spend too much on the environmental report. You get the feeling that they would sooner reduce the costs of producing the report, and instead use those savings for customer service and continued safe operations. It's a clever way of getting their message across."

(ANK Air Nippon B737-500)

Abbreviations

ACI	Airport Council International The ACI was established in 1991 and is the international association of the world's airports.
AEA	Association of European Airlines Cooperative body for European airlines (28 Airlines).
AESA	Atmospheric Effects of Stratospheric Aircraft Flyer
APU	Auxiliary Power Unit APU ensures an aircraft's energy supply and air conditioning when no infrastructure is available on the ground. Also it provides pressurized air for engine starting.
ASK	Available Seat Kilometers The available number of passenger seats multiplied by the distance flown in kilometers.
ATEC	Association of Air Transport Engineering and Research ATEC is one of the public foundations in aviation society in Japan and was established on September 13, 1989 based upon contributions from major air carriers in Japan namely JAL, ANA and JAS. The foundation is a non-profit organization under the supervision of Civil Aviation Bureau of Japan. Their primary objectives are to contribute to the flight safety and enhancement of any activities toward improvement and/or development in the flight operation and maintenance.
BAU	Business As Usual
BOD	Biochemical Oxygen Demand
CAEP	(ICAO)Committee on Aviation Environmental Protection CAEP is a technical committee responsible directly to the ICAO Council. CAEP is responsible for keeping the Annex 16 Standards.
CFC	Chlorofluorocarbons Certain halogenated hydrocarbons, best known under the trademark Freon. Ozone depletion material and also greenhouse gas.
CH_4	Methane One of the greenhouse gases. Aircraft NOx Emissions are expected to decrease tropospheric methane concentration.
CNS/ATM	Communications, Navigation and Surveillance Systems for Air Traffic Management Communication：To use Data-link with phonetic communication system for the conveyance of data and messages. To use Satellites instead of Hi-fi for oversea communication. Navigation：To replace the assisting navigation equipment on ground such as VOR/DME or ILS system with ground navigation satellites system (GNSS). Surveillance：To replace the oversea phonetic location report system as well as conventional radar function with the Automatic Dependent Surveillance (ADS). Air Traffic Management：To synchronize the operation of CNS and to reduce some procedures for the management. To provide more appropriate routes for aircraft within the limited space. See FANS.
CO	Carbon Monoxide Toxic and combustible gas formed by incomplete burning of substances containing carbon, e.g. fossil fuels.
CO_2	Carbon Dioxide Gas resulting in nature from the burning or decomposition of organic masses and the breathing process of humans and animals. CO_2 is an important greenhouse gas.
COD	Chemical Oxygen Demand
COP	Conference of the Parties (to the UNFCCC)
DPM	Diesel Particles Matter

ECAC European Civil Aviation Conference
A forum for cooperation and coordination between European national authorities in matters related to civil aviation.

EPNdB Effective Perceived Noise Level (dB).
A unit commonly used in an aviation context to express the average perceived noise level.

ETOPS Extended-Range Twin-Engine Operations. Most twin engine airliners are certified so that has to be able to fly normally within an hour of an airfield in the event of an emergency. The ETOPS program allows operators to deviate from this rule under certain conditions. By incorporating specific hardware improvements and establishing specific maintenance and operational procedures, operators can fly extended distances more than 60 min from the alternate airport.

EU European Union

FANS Future Air Navigation System
FANS is the adaptation of modern technology to enhance communication links between aircraft and air traffic controllers, improve a pilot's ability to safely navigate his aircraft and increase an air traffic controller's capability and capacity to monitor and control flights. In the mid-90's, the Future Air Navigation System (FANS) committee defined a plan for Communication Navigation Surveillance (CNS) and Air Traffic Management (ATM) - launching the next generation of en-route and terminal area airspace management concepts. See CNS/ATM.

FCCC (United Nation) Framework Convention on Climate Change
The 1992 United Nations Framework Convention on Climate Change is one of a series of recent agreements through which countries around the world are banding together to meet this challenge.

FIP Federal Implementation Plan

FMS Flight Management System
The Flight Management Computer System (FMCS), in conjunction with other interfacing equipment in the aircraft, forms an integrated, full-flight regime control and information system which provides automatic navigation, guidance, map display, and in-flight performance optimization.

g / KN Gram / Kilo Newtons

GSE Ground Support Equipment

GPS Global Positioning System
The Global Positioning System (GPS) is a worldwide radio-navigation system formed from a constellation of 24 satellites and their ground stations. GPS uses these satellites as reference points to calculate positions accurate to a matter of meters, with advanced forms of GPS to better than a centimeter.

GPU Ground Power Unit

GWP Global Warming Potential. The GWP is the ratio of the warming caused by a substance to the warming caused by a similar mass of carbon dioxide. Thus, the GWP of CO_2 is defined to be 1.0.

HC Hydrocarbons
Chemical compound of carbon and hydrogen. Unburned Hydrocarbons : Mixture of hydrocarbons that results from incomplete combustion processes.

HCFC Hydrochlorofluorocarbon
A compound consisting of hydrogen, chlorine, fluorine, and carbon.
The HCFCs are one class of chemicals being used to replace the CFCs. They contain chlorine and thus deplete stratospheric ozone, but to a much lesser extent than CFCs.

HFC Hydrofluorocarbon
A compound consisting of hydrogen, fluorine, and carbon. The HFCs are a class of

replacements for CFCs. All HFCs have an ozone depletion potential of 0. Some HFCs have high GWPs.

IATA International Air Transport Association
The general organization of international commercial aviation with more than 270 member airlines.

ICAO International Civil Aviation Organization
A specialized agency of the United Nations for international civil aviation.

IPCC Intergovernmental Panel on Climate Change
An expert panel established by UNEP (United Nations Environment Program) and WMO (World Meteorological Organization) to assess the consequences of human-induced climate change.

ISO International Organization for Standardization

LTO Landing/Take Off Cycle
To control pollutants from aircraft in the vicinity of airports, ICAO established emissions measurement procedures and compliance standards for soot, unburned hydrocarbons, carbon monoxide, and oxides of nitrogen. A landing and take-off cycle was defined to characterize the operational conditions of an aircraft engine within the environs of an airport.

Operating mode	Thrust setting	Time in mode(min)
Take-off	100%	0.7
Climb	85%	2.2
Approach	30%	4.0
Taxi / Idle	7%	26.0

MSDS Material Safety Data Sheet

NASA National Aeronautics and Space Administration

NO_2 Nitrogen Dioxides
It forms in the combustion process and is an important air pollution material.

NO_X Oxides of Nitrogen
Chemical compound consisting of one nitrogen and several oxygen atoms. NO_X are generated in combustion processes under high pressures and temperatures. These parameters have been increased in modern engines to reduce fuel consumption, and emissions of CO and HC.

NOTAM Notice To Airmen

N_2O Nitrous Oxides.
One of the greenhouse gases emissions from aviation.

O_3 Ozone.
Molecule consisting of three oxygen atoms. Close to the ground it is a component of smog. In the stratosphere ozone absorbs ultraviolet light. Nitric oxide emissions from air traffic at cruising altitudes cause an increase in atmospheric ozone.

ODA Official Development Assistance

ODP Ozone Depletion Potential
The ODP is the ratio of the impact on ozone of a chemical compared to the impact of a similar mass of CFC-11. Thus, the ODP of CFC-11 is defined to be 1.0.

PCB Polychlorinated biphenyl
PCBs are mixtures of synthetic organic chemicals. Due to their non-flammability, chemical stability, high boiling point and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications. Concern over the toxicity and persistence in the environment and health effects prohibited the manufacture, processing, and distribution in commerce of PCBs

ppm Parts per million

RPK Revenue Passenger Kilometers
The number of revenue passengers multiplied by the distance flown in kilometers.

PRTR	Pollutant Release and Transfer Register
R-NAV	Area Navigation Conventional aircraft navigation in airspace is based on the use of ground-based navigation aids (i.e. VOR/DME/NDB) and the resultant ATS route structure is anchored on these point source aids, being totally dependent upon the location of the ground facilities. R-NAV - a method of navigation which allows aircraft to operate on tracks joining any two points, within prescribed accuracy tolerances, without the need for the over flight of specific ground facilities. R-NAV is a method of navigation which permits aircraft operations on any desired flight path within the coverage of station referenced navigation aids or the limits of the capability of self-contained aids, or any combination thereof.
RVSM	Reduced Vertical Separation Minimum The goal of RVSM is to reduce the vertical separation above flight level (FL) 290 from the current 2000-ft minimum to 1000-ft minimum. This will allow aircraft to safely fly more optimum profiles, gain fuel savings and increase airspace capacity.
SO_2	Sulphur Dioxides Formed in combustion of fossil fuels. A colorless gas with an acid odor that is toxic when inhaled in large quantities. Jet fuel contains a minute proportion of sulfur, accordingly causes only minor emissions of this substance.
SO_X	Oxides of Sulphur
SPM	Suspended Particulate Matter
SST	Super Sonic Transport
VOC	Volatile Organic Compound Emitted during incomplete combustion of fossil fuels. In aviation emitted when the engine is run at low speed and the temperature in the combustion chamber is low. Also includes all types of solvents that evaporate from detergents and paints.
V-NAV	Vertical Navigation B777,B747-400,B767,A320 have this automatically vertical flying mode
WECPNL	Weighted Equivalent Continuous Perceived Noise Level. It is generally referred to as a "high level of aircraft noise" and is units showing the level of aircraft noise per day at one point. The calculations are made considering noise level per aircraft, hours of flying and number of flights. In the Environmental Standard for Aircraft Noise, the level WECPNL 70 or lower is applied to residential areas and WECPNL 75 or lower to non-residential areas where normal living level is to be maintained.

Fiscal year 2002 (Apr. 2002-Mar. 2003) ANA group's environmental data

					ANA group total	in ANA	Unit	Ratio of the previous y.
Ozone depletion	Halon and Fluorocarbons	CFC equipment in aircraft			3	3	kg	
		HFC equipment in aircraft			337	337	kg	
		Amount of discharge			0	0	kg	
Water-resources	Drying up the water	Building use	Total amount of water use		544,061	403,493	ton	
				Waterworks	447,341	330,702	ton	93.1%
				Recycled water	96,720	72,791	ton	
				Rate of recycled water use	18%	18%		
	Water pollution	Building	Total amount of waste treatment		69,995	45,231	ton	
				Industrial waste	51,491	26,727	ton	106.1%
				Cafeteria waste	18,504	18,504	ton	
		Airplane use for anti/de-icing	Total amount		1,043	1,043	KL	
Eco-system related environmental issue			The amount of PCB storage		4,375	4,258	kg	
Global warming	Deforestation	Use of paper	Total amount of using paper		73,494	56,666	ton	
				Total of copy paper (purchased)	68,319	51,491	1000 sheets	
				Recycled copy paper	52,717	46,853	(A4 conversion)	
				Fresh pulps copy paper	15,602	4,638		
				Rate of recycled paper use	77%	91%		
				Except copy paper (total)	5,175	5,175	ton	
				Recycled paper	425	425	ton	
				Fresh pulps paper	4,750	4,750	ton	
	Energy	Fuel consumption	Aircraft	Total amount of fuel consumption	3,240,716	2,901,785	(kl)	
				The amount of consumption (per seat-kilometer)	3.68	3.66	(L/100ASK)	
			Moter-vehicle	Total amount of fuel consumption	5,088	1,392	(kl)	
				Light oil	4,827	1,253	(kl)	
				Gasoline	261	139	(kl)	
			Building	Total amount of fuel consumption	4,146	3,466	(kl)	
				Heavy oil	1,329	651	(kl)	
				Light oil	1	0	(kl)	
				Kerosene, others	2,816	2,815	(kl)	
				Total amount of gas consumption	502,912	336,966	(m^3)	
				Liquefied natural gas	476,348	336,966	(m^3)	
				Liquefied petroleum gas	26,564	0	(m^3)	
		Electric power	Building	Total amount of electric power use	135,548,937	120,569,308	(kWh)	
Air pollution		**Exhaust gas**	**Aircraft**	**Number of aircrafts**	**175**	**139**	**Aircrafts**	**100.7%**
			Moter	**Number of moter-vehicles**	**1,919**	**843**	**Cars**	
				Eco-friendly moter-vehicle	**141**	**41**	**Cars**	
				Rate of eco-friendly moter-vehicle	**7%**	**5%**		
		Carbon dioxide (CO_2)			**817.4**	**730.9**	**10,000 ton-CO_2**	
			Aircraft	**The total amount of discharge**	**798.5**	**715.0**	**10,000 ton**	**98.5%**
				The amount of CO_2 (per seat-kilometer)	**90.59**	**90.21**	**g-CO_2/ASK**	
			Moter-vehicle	**The total amount of discharge**	**1.3**	**0.4**	**10,000 ton-CO_2**	
			Ground support equipment	**The total amount of discharge**	**17.6**	**15.6**	**10,000 ton-CO_2**	
		Carbon (C)			**223**	**199**	**10,000 ton-C**	
			Aircraft	**The total amount of discharge**	**218**	**195**	**10,000 ton**	**98.5%**
				The amount of CO_2 (per seat-kilometer)	**24.71**	**24.6**	**g-C/ASK**	**100.4%**
			Moter	**The total amount of discharge**	**0.4**	**0.1**	**10,000 ton-C**	
			Ground support equipment	**The total amount of discharge**	**4.8**	**4.2**	**10,000 ton-C**	
		Nitrogen oxide (NOx) Aircraft		**(The amount of discharge in LTO cycle)**	**0.65**	**0.53**	**10,000 t**	
		Hydrocarbon (HC) Aircraft		**(The amount of discharge in LTO cycle)**	**0.12**	**0.11**	**10,000 ton-HC**	
		Carbon monoxide (CO) Aircraft		**(The amount of discharge in LTO cycle)**	**0.64**	**0.53**	**10,000 ton-CO**	
		Fuel dumping at emer-landin		**The total amount of fuel dump**	**193**	**193**	**(kl)**	**136.2%**
				Number of dump	**4**	**4**	**Time**	**200.0%**
Waste		**Total amount of waste**			**8,602,385**	**7,074,628**	**kg**	
		From flight operations		**Gener**	**4,341,754**	**4,341,754**	**kg t a**	
		From office and maint. facil		**Wste Total**	**5,793,490**	**4,311,140**	**kg**	
				Sub total of general waste	**1,945,812**	**1,818,007**	**kg**	
				Sub total of industrial waste	**2,314,819**	**914,866**	**kg**	

The data shows ANA and the ANA group company (Air transportation, Maintenance, Grand handling, Vehicle maintenance, etc) in the 2002 fiscal year. Some part of group companies data do not addupped.

Participation in the United Nations Environment Programme's (UNEP) International Symposium: Air Transport, Airports and Sustainable Development

Since the formulation of the Kyoto Protocol in 1997, the UN, governments of the world, and various private sector industries and NGOs have been working toward a solution to the issue of global warming.

The UN's International Civil Aviation Organization and its Committee on Aviation Environmental Protection, as well as various working groups, have been considering measures for the airline industry such as taxation, emissions trading, and voluntary standards intended to control jet fuel exhaust emissions.

In 2002, prior to the Earth Summit in South Africa, UNEP held an International Symposium on Air Transport, Airports and Sustainable Development in Paris.

The conference consisted of panelists' reports on the environmental activities and achievements of governments, researchers, environmental NGOs, and airlines, followed by a Q&A session. Though most of the 150 participants were from Europe or the Americas, ANA's Environmental Affairs Department was invited to send a panelist to the conference as a representative of the Asia/Japan region.

As a panelist for the Regional and Global Pollution session, ANA's representative debated the issues, in front of approximately 50 session participants, with fellow panelists from the British Department for Transport, the German Federal Ministry for the Environment, the French Aéroports de Paris Group, and an American environmental research agency. ANA's panelist was vocal in discussing our voluntary plan for global warming prevention and the successes of our global environment policies, which involve improving our operations through the update of equipment, formation of alliances, and maintenance.

Throughout the conference, ANA's representative spoke from the point of view of the airline industry. However, being that the symposium was not exclusively a forum for airlines, ANA's explanations were met by opposing views from the NGO community, making for a somewhat tense atmosphere.

During the break, ANA's representative met with representatives from other participating aviation companies, including Boeing, Airbus, Air France, Lufthansa, and the Association of European Airlines, to discuss the progress of the conference.

ANA's position during the symposium focused on the importance of guaranteeing fair competition between the airlines of countries with Kyoto Protocol obligations and those without, as well as the necessity of letting the market decide whether airlines or ground transportation are more suited for short-distance travel.

Panel Discussions

By participating in the symposium, we realized anew that the future of air transport in harmony with the environment depends on thorough debate among parties with varying opinions. Through the course of such debate, we are confident that ANA will be recognized for its efforts.

Environmental Report 2003
(FY. 2002/2003)

Sep. 2003

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Summarized information concerning ANA environmental conservation efforts is also available on URL (http://www.ana.co.jp)