

**Voluntary Agreement on the Reduction
of Greenhouse Gas Emissions
2006 Annual Report**

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1. Context/Background

1.1 Kyoto Protocol

The 1997 Kyoto Protocol is an amendment to the United Nations Framework Convention on Climate Change, which assigns mandatory emission limits for the reduction of greenhouse gas (GHG) emissions to the signatory countries.

The objective of the convention is the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

As of August 2007, the convention had a total of 169 instruments of ratification by countries and other governmental entities. Notable exceptions include the United States and Australia. Other countries, such as China, have ratified the protocol but are not required to reduce carbon emissions under the current agreement.

1.2 Role of ICAO

Canadian aviation is part of the larger international industry. International aviation accounts for roughly 70% of Canada's total aviation activity. Aircraft are used interchangeably on domestic, transborder and international routes. These aircraft are built and operated in accordance with international standards and regulations set by the International Civil Aviation Organization (ICAO). ICAO is a specialized agency of the United Nations that sets international standards and regulations necessary for the safety, security, efficiency and regularity of air transport and serves as the medium for cooperation in international civil aviation among its Contracting States.

In 1997, the agency was recognized, in article 2.2 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change, as the appropriate global body for developed countries to pursue the limitation or reduction of greenhouse gas emissions resulting from international aviation.¹

Under the Kyoto protocol, ICAO is assigned with the responsibility of establishing standards and targets for greenhouse gases related to international aviation activity. The protocol specifically excludes emissions from international aviation because of the difficulty in allocating them to a specific country. For example, it is unclear which country should be responsible for emissions involving an airline from Europe flying over South America for example.

Since Kyoto, ICAO has developed guidelines for reducing greenhouse gas emissions from civil aviation and has co-operated with organizations directly involved in the Climate Change Convention.

1.3 ICAO Voluntary Agreement Guidance

ICAO's current environmental activities are largely undertaken through the Committee on Aviation Environmental Protection (CAEP). Through CAEP, ICAO has developed Circular 303, which provides guidance to assist interested parties in establishing voluntary agreements to address emissions². The guidance material lends support to ICAO's goal of harmonized efforts and underscores the importance of voluntary initiatives in addressing the problem of aviation emissions.

¹United Nations Framework Convention on Climate Change
http://unfccc.int/essential_background/convention/background/items/2853.php

²http://www.icao.int/icao/en/env/Caep_Template.pdf

1.4 Canada First to Strike Voluntary Agreement on GHG Emissions in Aviation

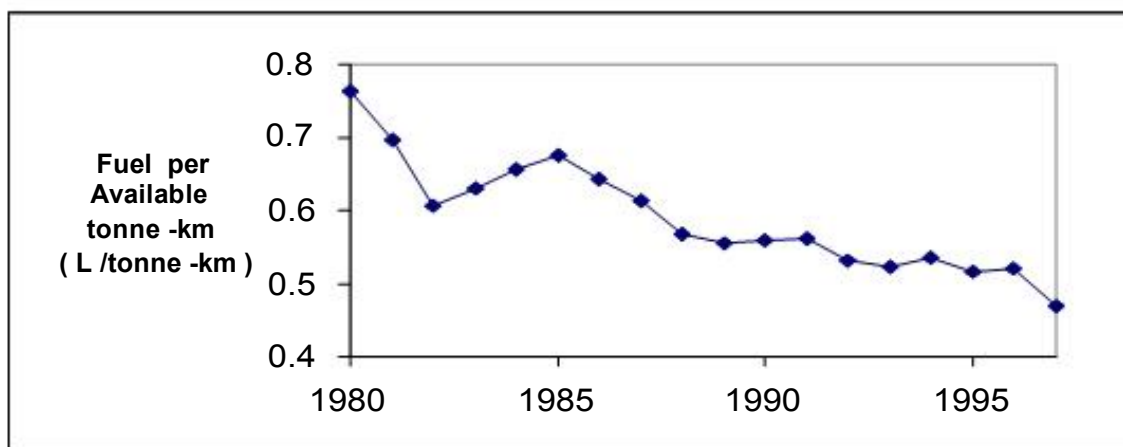
On June 29, 2005, the Air Transport Association of Canada (ATAC) and Transport Canada signed a voluntary agreement based on ICAO's template. This agreement was the first of its kind within the aviation sector in Canada and in the world. Upon signing this Memorandum of Understanding (MOU), Canada's air service providers became the first air carriers in the world to have reached a voluntary agreement with their respective governments to reduce the growth of GHG emissions both domestically and internationally. The Agreement sets out a GHG emissions reduction goal whereby ATAC undertakes to encourage its members to improve their efficiency and thus reduce collective ATAC member fleet greenhouse gas emissions on a per unit basis (through fuel efficiency improvements, e.g., reduction in litres of fuel/Revenue Tonne Kilometre) by an average of 1.1 percent per annum, reaching a cumulative improvement of 24 percent in 2012 compared to the 1990 base case scenario. It also addresses the principles governing the Agreement, the responsibilities of the parties, and provisions for its management and administration. This report is in keeping with ATAC's responsibilities as laid out in the MOU.

1.5 Description of the Industry

The Air Transport industry's demand is derived from corporate and individual economic wealth. Our future is directly linked to the "new" economy in place, post climate change awareness. Energy costs are the second highest cost driver for airlines after labour. Fuel typically accounts for at least 25% of direct aircraft operating costs depending on world oil prices.

In Canada, great progress has been made in improving fuel efficiency (e.g., litres per revenue tonne-kilometre, litres per revenue passenger kilometre). Since the beginning of the jet age fuel reduction, efficiencies have been a major goal and success for our industry. In fact, fuel efficiency improved 51% from 1970 to 1995.³ These gains in efficiency have been achieved mainly through improvements in engine and aircraft design, flight planning, flight operations and ground operations.

Canada's air service providers have an economic interest in reducing their carbon footprint. Improvements in fuel efficiency translate into lower costs and fewer greenhouse gas emissions. It is for this reason that Canada's aviation industry was making improvements in this regard well before Kyoto or the Memorandum of Understanding (MOU) with Transport Canada. The following chart demonstrates our fuel efficiency trends prior to the 1997 Kyoto Protocol.⁴



³Sypher::Mueller International Inc, "Climate Change Air Sub-Group Report" July 1999, page 4 ⁴
Source: Statistics Canada, "Canadian Civil Aviation", 1980 - 1997

Beyond the cost of fuel, the air transport industry has an interest in improving efficiencies because of other possible outcomes of climate change such as rising sea levels flooding airports, permafrost degradation adversely affecting northern airport runways, and permafrost degradation affecting northern ice roads and thus shortening their useful season.

2. Objective of Memorandum of Understanding (MOU)

The objective of the voluntary Memorandum of Understanding is to limit or reduce emissions of greenhouse gas from aviation in Canada. The Agreement sets out a GHG emissions reduction goal for members of ATAC. The MOU also details the principles governing the voluntary agreement, the responsibilities of the parties pursuant to the Agreement, and provisions for its management and administration. Included in these provisions are the details of data collection and reporting.

2.1 Target

Pursuant to the terms of the MOU, ATAC undertakes to encourage its members to improve their efficiency and thus reduce collective ATAC member fleet greenhouse gas emissions on a per unit basis (through fuel efficiency improvements, e.g., reduction in litres of fuel/Revenue Tonne Kilometre) by an average of 1.1 percent per annum, reaching a cumulative improvement of 24 percent in 2012 compared to the 1990 base case scenario. The 1.1% reduction target is similar to that agreed to by operator members of the International Air Transport Association (IATA).

2.2 ATAC GHG Emissions Reporting System (AGERS)

In July 2003, a preliminary contract was agreed to between TC and ATAC where ATAC was contracted to: “provide the impetus and tools for reducing greenhouse gases emissions in the air transport industry and thus assist Canada in meeting its Kyoto Protocol commitments.”

With these goals in mind, ATAC developed a two-pronged approach to the project:

- 1) Development and implementation of the ATAC GHG Emissions Reporting System, i.e., AGERS. This involved:
 - a) Developing a standardized relational database.
 - b) Hosting, controlling, and maintaining the database.
 - c) Individual companies to provide data to ATAC.
 - d) Handling all data on a strictly confidential basis.
 - e) Aggregating national data to be compiled and reported in a de-identified manner to Transport Canada and the Voluntary Challenge Registry Inc. on an annual basis.
- 2) Achieving industry buy in by briefing ATAC member companies on:
 - a) The subject of GHG as it relates to aviation.
 - b) What the air sector can do to mitigate GHG emissions.
 - c) The use and benefits of AGERS to the companies individually.
 - d) The benefits of AGERS to the air sector as a whole.

The building stages of the AGERS project were rolled out along the following timeline:

Nov. 30, 2003	Development of prototype software:
Dec. 31, 2003	Prototype software evaluation, final software development/evaluation, and de-bugging:
Mar. 31, 2004	Briefings, demonstrations, training, expansion options review, and final report to the Minister:

2.2.1 Annual Data Requested

Each year, ATAC requests the following data from its membership in order to populate the AGERS database:

- Litres of fuel burned per year
- Available seat-kilometres or miles (ASK or ASM)
- Available tonne-kilometres or ton-miles (ATK or ATM) (cargo only)
- Revenue passenger-kilometres or miles (RPK or RPM)
- Revenue tonne-kilometres or ton-miles (RTK or RTM) (cargo only)
- Total available tonne-kilometres or ton-miles (Total ATK or Total ATM) (Total of passengers weight @ 220lbs each plus cargo weight)
- Total revenue tonne-kilometres or ton-miles (Total RTK or Total RTM) (Total of passengers weight @ 220lbs each plus cargo weight)

2.2.2 AGERS Output

Once that data is collected, de-identified and aggregated the AGERS database is equipped to produce the following data products:

- Current and annual air sector GHG total emission summary reports
- Annual air sector GHG emissions intensity trend reports
- Individual company emissions reports, on request by company affected •
Air sector reports using aggregate data

2.2.3 AGERS Units

The measurement units used by AGERS are those units that are industry recognized and accepted, such as:

- litres of fuel/available tonne-kilometre (and ton-mile)
- litres of fuel/revenue tonne-kilometre (and ton-mile)
- litres of fuel/available seat-kilometre (and mile)
- litres of fuel/revenue seat-kilometre (and mile)
- mega-tonnes CO₂e {equivalent includes Carbon Dioxide (CO₂), Methane (CH₄), & Nitrous Oxide (N₂O)}
- tonnes CO₂e/passenger-kilometre
- tonnes CO₂e/tonne-kilometre

2.2.4 AGERS Benefits

The AGERS database provides the following benefits in accordance with the principles agreed upon in the 2003 contract and in the voluntary MOU with Transport Canada:

- Provides summaries and trends of fuel used and GHG emitted
- Quality data and trends for cost and environmental impacts analysis •

Quantitative data for fuel and cost saving targets

- Aviation sector proactive attitude is highlighted
- Less requirement for new regulatory initiatives on aviation sector regarding emissions

2.3 Industry Participation

The information contained in the AGERS database contemplates aircraft fuel use and does not quantify fuel used in ground equipment. It does take into consideration the domestic, trans-border and international operations. The ATAC passenger airline members who contributed data to the AGERS database in 2006 were:

Air Canada
Air Canada Jazz
Air Transat
First Air
WestJet
Skyservice Airlines
Canadian North
Sunwing

2.4 Methodology

The reports generated by the AGERS database will provide a mechanism whereby we may compare ATAC member fleet greenhouse gas emissions on a per unit basis. The objective set out in the MOU is to reduce the intensity of our emissions by an average of 1.1 percent per annum, thus reaching a cumulative improvement of 24 percent in fuel used per Revenue Tonne Kilometre (RTK) or Revenue Passenger Kilometre (RPK) by 2012 compared to the 1990 base case scenario established in the Kyoto Protocol. The 1.1% reduction target is similar to that agreed to by operator members of the International Air Transport Association (IATA). Prior to the 2003 AGERS Baseline Year, historical data has been fully utilized as provided by the ATAC operator members. The historical data is much more difficult to obtain but has been sought out and input where available into AGERS after validation by ATAC.

2.4.1 Calculations

In order to efficiently and accurately input data into the relational database, standardized forms have been utilized extensively. The input data is then used for calculations through several formulas to obtain the required reports and charts. The emissions and conversion factors used below have been drawn from Canada's Greenhouse Gas Inventory 1990-2000, Greenhouse Gas Division Environment Canada, June 2002, Table D-5. The following formulas are applied:

$$1 \text{ litre Aviation Jet Fuel} = 2.550 \text{ kg CO}_2$$

$$1 \text{ litre Aviation Jet Fuel} = 2.550 \text{ kg CO}_2 + 0.00008 \text{ kg CH}_4 + 0.00025 \text{ kg N}_2\text{O} \quad 1 \text{ litre}$$

$$\text{Aviation Jet Fuel} = 2.55033 \text{ kg CO}_2\text{e}$$

$$\text{CO}_2\text{e (mega tonnes) Fuel Used} \times 2.55033 / 1000$$

$$\text{CO}_2\text{e (tonnes) / RPK} = (\text{Fuel Used} \times 2.55033) / (\text{RPM} \times 1.6)$$

$$\text{CO}_2\text{e (tonnes)/Cargo RTK} = (\text{Fuel Used} \times 2.55033) / (\text{Cargo RTM} \times 1.6 \times 0.91)$$

$$\text{CO}_2\text{e (tonnes) / Total RTK} = (\text{Fuel Used} \times 2.55033) / \{(\text{RPM} \times 1.6 \times 0.91) + (\text{Cargo RTM} \times 1.6 \times 0.91)\}$$

2.5 2006 Results

2.5.1 AGERS 2006 Data Summary

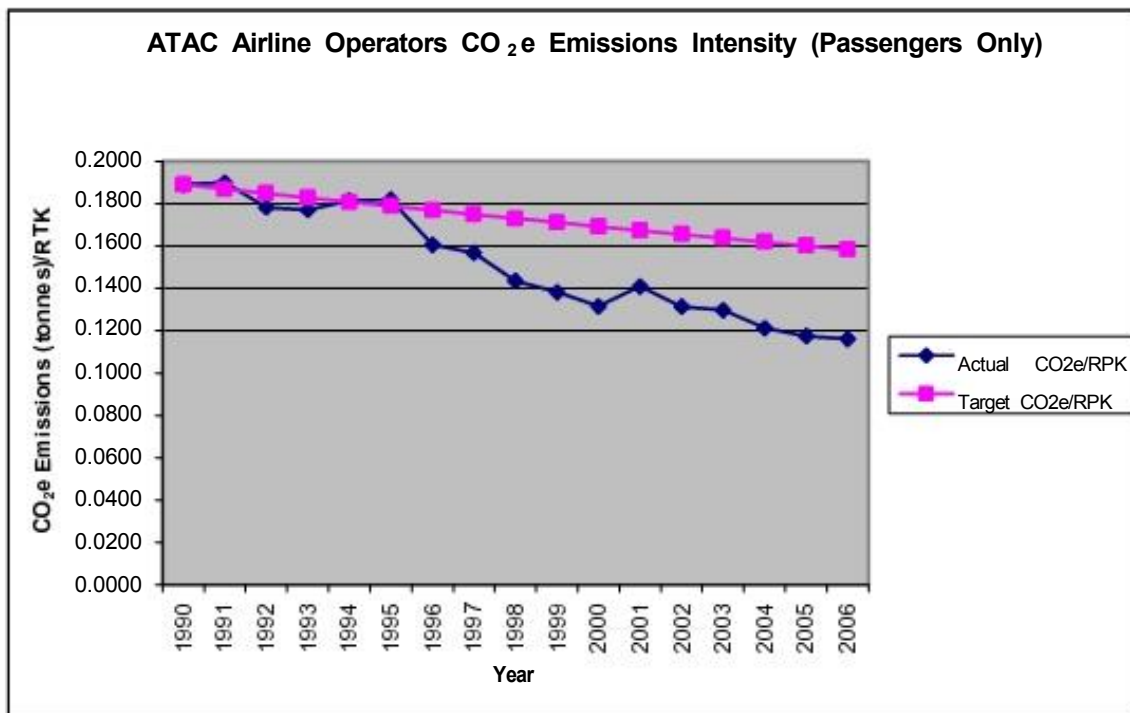
The AGERS Operational summary listed below indicates the data for 2006. The charts below compare this data against previous years including the 2003 base year and contain information volunteered by the 8 participating ATAC member companies encompassing in excess of 95% of Canadian domestic passenger and cargo air traffic in 2006.

Fuel Used (litres)	5,114,652,581
ASM (Available Seat Mile)	86,670,877,152
Litres/ASM	0.0590
ASK (Available Seat Kilometres)	138,673,403,443
Litres/ASK	0.0369
RPM (Revenue Passenger Mile)	70,188,484,261
Litres/RPM	0.0729
RPK (Revenue Passenger Kilometre)	112,301,574,818
Litres/RPK	0.0455
Pax RTK	11,230,157,482
Cargo ATM (Available Ton Mile)	8,823,611,814
Litres/Cargo ATM	0.5797
Cargo ATK (Available Tonne Kilometre)	14,117,778,902
Litres/Cargo ATK	0.3981
Cargo RTM (Revenue Ton Mile)	916,323,099
Litres/Cargo RTM	5.5817
Cargo RTK (Revenue Tonne Kilometre)	1,334,166,432
Litres/Cargo RTK	3.8336
Total RTK	12,564,323,914
Litres/Total RTK	0.4071
Litres/Total 100RTK	40.71
CO₂e (mega tonnes CO₂ equivalent)	13.04
CO₂e (tonnes)/RPK	0.1162
CO₂e (tonnes)/Cargo RTK	9.7769
CO₂e (tonnes)/Total RTK	1.0382

2.5.2 ATAC Airline Operators CO₂e Emissions Intensity

The following chart examines the CO₂e emissions intensity on passenger only flights. The magenta line represents the target of 1.1% reduction in emissions intensity per year from the 1990 base case scenario. The blue line represents the actual emissions intensity produced by the contributing passenger operator members. Emissions intensity is calculated using emissions per distance metric. Comparing the Carbon Dioxide equivalent CO₂e produced per distance unit derives changes in emissions intensity. As per industry standard, distance traveled on passenger aircraft is recorded in Revenue Passenger Kilometres (RPK). In Cargo aircraft, distance is reflected in Revenue Tonne Kilometres (RTK). The chart below demonstrates that passenger aircraft have been consistently exceeding their target numbers since 1997.

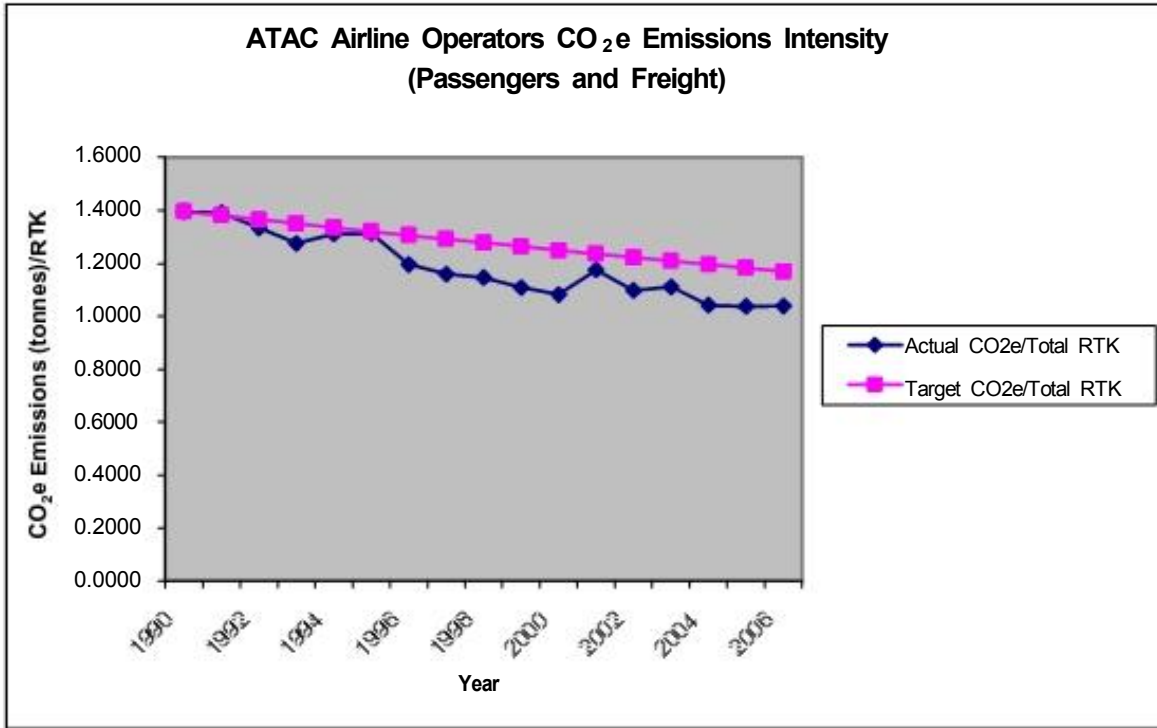
The target reduction from the MOU base year of 2003 of 1.1% per annum would have added up to an cumulative reduction of 4.4% on a per unit basis by 2006. As the charts below demonstrate, ATAC's members have exceeded the targets set out in the Agreement by over-achieving their target with a successful reduction of 6.6% between 2003 and 2006. The numbers are more striking when we view passenger air travel in isolation from freight. The chart below demonstrates that Canada's passenger air carriers have reduced their emissions intensity by 10.4% since the signing of the MOU with Transport Canada. This reduction exceeds the target set out in the voluntary agreement by 6%. Finally, it is worth noting that although the data from 1990 is limited, emissions intensity has been reduced by 25.6% since 1990.



2.5.3 ATAC Airline Operators CO₂e Emissions Intensity (Passengers and Freight)

While passenger air carriers have made several changes in order to reduce their carbon footprint, one of the most dramatic factors in their numbers was the renewal of ageing fleets with newer, more fuel efficient aircraft. Also, Canada's air cargo fleet tends to be older than the passenger fleet. It is reasonable to expect that there will be further improvements in the

overall emissions intensity when Canada's air cargo operators replace their own ageing aircraft. The following chart demonstrates the emissions intensity for both passenger and freight operators. The chart demonstrates that we are still exceeding the targets set out in the MOU when freight is included, but by more modest margins.



3. Activities under this MOU

3.1. Activities Undertaken by ATAC

In addition to developing the AGERS database, ATAC has continuously encouraged its member companies to participate in AGERS under the auspices of the MOU. This has taken place through regular emails and articles in Flightplan, ATAC's magazine. Presentations have also been given directly to member companies and at the annual Environmental Affairs Committee meeting.

As a result of these efforts, ATAC has been able to capture data covering in excess of 95% of Canadian domestic passenger and cargo air traffic. Participation has steadily increased and ATAC continues to promote participation in this system and in the objectives of the MOU to its membership. ATAC's Vice President, Engineering and Maintenance, has been vigilant in securing this data as well as de-identifying commercially sensitive information.

ATAC has also encouraged its members to participate in ICAO conferences and other emissions reduction fora. A workshop, supported by ATAC, was held at ICAO in September 2006 to promote operational efficiency opportunities, many of which have been identified in the MOU. The workshop had approximately 250 participants from Canada and around the world.

3.2. Activities Undertaken by ATAC Members

In addition to the data collected in the AGERS system, the MOU sets out an action plan for the reduction of GHGs from the aviation sector. Various methods for improving operational efficiencies and reducing emissions are set out in the MOU and its appendices.

Pursuant to the terms of the MOU, ATAC's member companies have instituted new procedures to limit fuel burn and make their operations more efficient and green. Due to the privacy issues set out in the MOU, the actions taken are listed, but the companies are not specifically identified.

3.2.1. Activities under The Freight Sustainability Demonstration Program (FSDP) and the Freight Efficiency Program (FEP)

Transport Canada had two freight contribution programs under the Environmental Initiatives division of the Environmental Affairs Directorate that were completed March 31, 2007.

- The Freight Efficiency and Technology Initiative, which included a five-year \$4.7 million Freight Sustainability Demonstration program, designed to encourage the adoption of technologies or best practices that can reduce greenhouse gas emissions from all freight modes.
- The Non-Road Freight Efficiency Program, which included a four-year \$5 million Freight Efficiency Program, was designed to provide incentives for the purchase and installation of technology and equipment that reduce GHG emissions cost-effectively in the rail, marine and air freight transportation sectors.

The terms of the MOU state that ATAC will encourage its members to apply for and participate in programs such as these. To the best of our knowledge, prior to the completion of this program, three ATAC member companies were granted project funding under these programs.

Project 1: The Fuel Management Program

Project 2: Alternative Fuels, Ground Handling Equipment

Project 3: Fuel Management Program (Required Navigational Performance)

3.2.2 Other Activities Undertaken by ATAC Members Under the MOU

ATAC member companies have made several changes to the way they do business under the auspices of the MOU. In 2006, these changes can be grouped into roughly 4 categories: a) Aircraft modifications and maintenance b) Aircraft operating procedures c) In flight/catering d) Ground equipment operations. The effect of some of these changes are not directly measurable, however the compound effect of many relatively small changes will reflect in the overall AGERS numbers.

3.2.2.1 Aircraft Modifications and Maintenance

Various physical modifications were made that will have an affect on the overall carbon footprint of the operator. In 2006 some of these activities included:

- a) Winglets - At least two companies installed winglets on their Boeing 737s.

- b) Life vests - One member company replaced their stock of passenger life vests placed in the aircraft to a lighter model to reduce aircraft weight.
- c) Engine refurbishment criteria - One member company is exploring the possibility of adding a Specific Fuel Consumption (SFC) criteria to the contractual requirements for engine overhaul.

3.2.2.2 Aircraft Operating Procedures

Some ATAC Member companies made changes to their operating procedures in order to reduce fuel consumption and therefore emissions. Some of these changes include:

- a) Employing single engine taxi procedures
- b) Dispatch Route Optimization
- c) Adding additional approaches (RNP RNAV)
- d) Implementing RNP RNAV departures
- e) Making an ETOPS Critical Fuel Exemption Request
- f) Working with NAV CANADA on Airspace Redesign Projects
- g) Smart Operational Empty Weight Management (removing unnecessary equipment from the aircraft to reduce weight)
- h) Creating a Fuel Efficiency Key Performance Indicator in combination with current Aircraft Performance Monitoring Program
- i) Calculating the cost of weight (COW) to quantify the cost of 1kg of payload for one year given consistent fuel price. In this test case, the calculation was done for an A330 and an A310 aircraft.
- j) Limiting APU usage on ground to 10 minutes on arrival and 20 minutes before departure at North American and European destinations.
- k) Reducing aircraft weight by switching to a lighter ULD model cargo containers
- l) Altering loading procedures to improve CG.
- m) Reducing fuel consumption during the first 3000 feet of climb by using ICAO's NADP2 take-off climb procedure.
- n) Econ climb: Reducing fuel burn by accelerating to en-route climb speed as soon as flap retraction is complete.
- o) Idle reverse: Using braking with idle reverse at landing rather than maximum powered reverse thrust
- p) Single air-conditioning pack operation, i.e., using a single air-conditioning pack whenever possible.
- q) Alternate Fuel - a minor refinement of fuel computation for close-in alternate airports to ensure it reflects actual flight distance. This is to ensure aircraft do not carry excess fuel over the regulatory requirement;
- r) Use of Cost Index in flight planning
- s) Use of APU - whenever possible, only one air conditioning pack is used during operation of the APU on the ground to reduce fuel burn.
- t) Performing trial runs on a flight planning system to further reduce fuel use.
- u) Fuel Burn Reduction procedure: In an effort to increase efficiency and reduce fuel costs, an Economical Flight Management Program (EFM) is being introduced.
- v) One company started a trial "Fuel Tankering Program" with NavTech software and will also introduce a flight specific "Cost Index" figure based on time cost vs. fuel cost.
- w) Introducing a reduced APU operations procedure aimed at cutting fuel consumption and per hour lease costs.
- x) Instituting a program of washing engines at a certain frequency to improve their efficiency
- y) Improved payload planning
- z) Presenting and explaining "Cost Index" to every recurrent ground school class in 2007
- aa) An internal Fuel Audit to examine all areas of the operation

- bb) Providing additional fuel guidance to dispatch based on historical operations
- cc) Purchasing a new flight planning system that automatically generates flight plans for least cost operations.
- dd) Improved flight plans by using more accurate taxi fuel and better forecasting zero fuel weight.
- ee) Putting in place a process whereby the pilots must justify any additional fuel. ff) Using a single engine on taxi in and taxi out
- gg) Optimum Centre of Gravity (CG) - i.e., whenever the load factor is below 90-95%, optimizing CG location through a better distribution of the passengers in the cabin. CG location has a direct influence on fuel burn during the climb and descent portions of the flight, as in cruise Airbus aircraft incorporate a fuel transfer to the trim tank (tail section) to optimize CG location.
- hh) Towing aircraft to runway - although this initiative is not being considered in the immediate future, preliminary discussions have begun with the Montreal and Toronto Airport Authorities and NAV CANADA to conduct a risk assessment and eventually a feasibility trial.

3.2.2.3 In-flight/Catering

Some of the ATAC member companies made changes to their In-flight/catering services provided in order to look for ways to reduce the overall weight of the aircraft and therefore reduce fuel consumption. Some of these changes included:

- a) Reducing the amount of potable water carried to match fill levels with actual requirements.
- b) Saving weight by reducing return catering, matching catering provisioning with actual requirements and by eliminating/minimizing items such as blankets, magazines, and newspapers.
- c) Reduction of catering overage - through periodic audits one company monitored the usage of all catering items and made adjustments to avoid carrying excess quantities.

4. Conclusion

The 2006 AGERS data demonstrates that ATAC members have taken the goals set out in the voluntary agreement signed on June 29th, 2005 very seriously and have exceeded projected reductions achieving a 6.6% reduction in emissions intensity since 2003 and a 25.6% reduction when compared to the 1990 Kyoto base year. While it is clear that more work can be done, particularly on the freight side of the industry, many companies have made physical changes and modifications to their aircraft, and have implemented many operational changes in order to reduce the amount of fuel consumed. These changes occurred during a period of high demand for air services.

APPENDIX A

Glossary of Acronyms

ASK: Available Seat Kilometres

ASM: Available Seat Miles

ATAC: Air Transport Association of Canada

ATK: Available Tonne Kilometres

ATM: Available Ton Miles

CH₄: Methane

CAEP: Committee on Aviation Environmental Protection

CO₂: Carbon Dioxide

CO₂e: Carbon Dioxide equivalent, which for aviation jet fuel includes CO₂, CH₄, and N₂O

Fuel Used: Aviation Jet Fuel measured in litres

IATA: International Air Transport Association ICAO:

International Civil Aviation Organization MOU:

Memorandum of Understanding

N₂O: Nitrous Oxide

RPK: Revenue Passenger Kilometres

RPM: Revenue Passenger Miles

SFC: Specific Fuel Consumption

TC: Transport Canada

APPENDIX B

ATAC Greenhouse Gas Emissions Reporting System (AGERS)

2005 Operational Data Summary

Participating Operators: 8 ATAC member companies providing in excess of 95% of Canadian domestic passenger and cargo air traffic in 2005.

Fuel Used (litres)	4,816,572,646
ASM (Available Seat Mile)	82,008,407,292
Litres/ASM	0.0587
ASK (Available Seat Kilometres)	131,213,451,667
Litres/ASK	0.0367
RPM (Revenue Passenger Mile)	65,382,079,337
Litres/RPM	0.0737
RPK (Revenue Passenger Kilometre)	104,611,326,939
Litres/RPK	0.0460
Pax RTK	10,461,132,694
Cargo ATM (Available Ton Mile)	8,645,594,720
Litres/Cargo ATM	0.5571
Cargo ATK (Available Tonne Kilometre)	13,832,951,552
Litres/Cargo ATK	0.3826
Cargo RTM (Revenue Ton Mile)	946,531,670
Litres/Cargo RTM	5.0887
Cargo RTK (Revenue Tonne Kilometre)	1,378,150,112
Litres/Cargo RTK	3.4950
Total RTK	11,839,282,805
Litres/Total RTK	0.4068
Litres/Total 100RTK	40.68
CO₂e (mega tonnes CO₂ equivalent)	12.28
CO₂e (tonnes)/RPK	0.1174
CO₂e (tonnes)/Cargo RTK	8.9133
CO₂e (tonnes)/Total RTK	1.0376

APPENDIX C

ATAC Greenhouse Gas Emissions Reporting System (AGERS)

2004 Operational Data Summary

Participating Operators: 7 ATAC member companies providing in excess of 95% of Canadian domestic passenger and cargo air traffic in 2004.

Fuel Used (litres)	4,496,335,570
ASM (Available Seat Mile)	76,516,452,817
Litres/ASM	0.0588
ASK (Available Seat Kilometres)	122,426,324,507
Litres/ASK	0.0367
RPM (Revenue Passenger Mile)	59,142,888,137
Litres/RPM	0.0760
RPK (Revenue Passenger Kilometre)	94,628,621,019
Litres/RPK	0.0475
Pax RTK	9,462,862,102
Cargo ATM (Available Ton Mile)	8,361,501,257
Litres/Cargo ATM	0.5377
Cargo ATK (Available Tonne Kilometre)	13,378,402,011
Litres/Cargo ATK	0.3693
Cargo RTM (Revenue Ton Mile)	1,056,695,689
Litres/Cargo RTM	4.2551
Cargo RTK (Revenue Tonne Kilometre)	1,538,548,923
Litres/Cargo RTK	2.9225
Total RTK	11,001,411,025
Litres/Total RTK	0.4087
Litres/Total 100RTK	40.87
CO₂e (mega tonnes CO₂ equivalent)	11.47
CO₂e (tonnes)/RPK	0.1212
CO₂e (tonnes)/Cargo RTK	7.4532
CO₂e (tonnes)/Total RTK	1.0423

APPENDIX D

ATAC Greenhouse Gas Emissions Reporting System (AGERS)

2003 Operational Data Summary

Participating Operators: 9 ATAC member companies providing in excess of 95% of Canadian domestic passenger and cargo air traffic in 2003.

Fuel Used (litres)	4,513,691,738
ASM (Available Seat Mile)	74,569,607,015
Litres/ASM	0.0605
ASK (Available Seat Kilometres)	119,311,371,224
Litres/ASK	0.0378
RPM (Revenue Passenger Mile)	55,450,825,177
Litres/RPM	0.0814
RPK (Revenue Passenger Kilometre)	88,721,320,283
Litres/RPK	0.0509
Pax RTK	8,872,132,028
Cargo ATM (Available Ton Mile)	8,118,218,394
Litres/Cargo ATM	0.5560
Cargo ATK (Available Tonne Kilometre)	12,989,149,430
Litres/Cargo ATK	0.3819
Cargo RTM (Revenue Ton Mile)	1,022,019,219
Litres/Cargo RTM	4.4164
Cargo RTK (Revenue Tonne Kilometre)	1,488,059,983
Litres/Cargo RTK	3.0333
Total RTK	10,360,192,011
Litres/Total RTK	0.4357
Litres/Total 100RTK	43.57
CO₂e (mega tonnes CO₂ equivalent)	11.51
CO₂e (tonnes)/RPK	0.1297
CO₂e (tonnes)/Cargo RTK	7.7358
CO₂e (tonnes)/Total RTK	1.1111

APPENDIX E

ATAC Greenhouse Gas Emissions Reporting System (AGERS)

2002 Operational Data Summary

Participating Operators: 7 ATAC member companies providing in excess of 92% of Canadian domestic passenger and cargo air traffic in 2002.

Fuel Used (litres)	4,560,273,855
ASM (Available Seat Mile)	73,143,516,458
Litres/ASM	0.0623
ASK (Available Seat Kilometres)	117,029,626,333
Litres/ASK	0.0390
RPM (Revenue Passenger Mile)	55,352,746,179
Litres/RPM	0.0824
RPK (Revenue Passenger Kilometre)	88,564,393,886
Litres/RPK	0.0515
Pax RTK	8,856,439,389
Cargo ATM (Available Ton Mile)	9,158,368,037
Litres/Cargo ATM	0.4979
Cargo ATK (Available Tonne Kilometre)	14,653,388,859
Litres/Cargo ATK	0.3420
Cargo RTM (Revenue Ton Mile)	1,194,635,913
Litres/Cargo RTM	3.8173
Cargo RTK (Revenue Tonne Kilometre)	1,739,389,889
Litres/Cargo RTK	2.6218
Total RTK	10,595,829,278
Litres/Total RTK	0.4304
Litres/Total 100RTK	43.04
CO₂e (mega tonnes CO₂ equivalent)	11.63
CO₂e (tonnes)/RPK	0.1313
CO₂e (tonnes)/Cargo RTK	6.6864
CO₂e (tonnes)/Total RTK	1.0976

APPENDIX F

ATAC Greenhouse Gas Emissions Reporting System (AGERS)

2001 Operational Data Summary

Participating Operators: 5 ATAC member companies providing in excess of 97% of Canadian domestic passenger and cargo air traffic in 2001.

Fuel Used (litres)	4,759,937,974
ASM (Available Seat Mile)	68,090,576,348
Litres/ASM	0.0699
ASK (Available Seat Kilometres)	108,944,922,157
Litres/ASK	0.0437
RPM (Revenue Passenger Mile)	53,861,074,039
Litres/RPM	0.0884
RPK (Revenue Passenger Kilometre)	86,177,718,462
Litres/RPK	0.0552
Pax RTK	8,617,771,846
Cargo ATM (Available Ton Mile)	9,338,392,725
Litres/Cargo ATM	0.5097
Cargo ATK (Available Tonne Kilometre)	14,941,428,360
Litres/Cargo ATK	0.3501
Cargo RTM (Revenue Ton Mile)	1,173,961,636
Litres/Cargo RTM	4.0546
Cargo RTK (Revenue Tonne Kilometre)	1,709,288,142
Litres/Cargo RTK	2.7847
Total RTK	10,327,059,988
Litres/Total RTK	0.4609
Litres/Total 100RTK	46.09
CO₂e (mega tonnes CO₂ equivalent)	12.14
CO₂e (tonnes)/RPK	0.1409
CO₂e (tonnes)/Cargo RTK	7.1020
CO₂e (tonnes)/Total RTK	1.1755



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