IMPROVING AVIATION EFFICIENCY AND REDUCING EMISSIONS: A NACC FRAMEWORK

Prepared by
the National Airlines Council of Canada

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INTRODUCTION

FUEL EFFICIENCY, AVIATION AND ENVIRONMENTAL STEWARDSHIP

For more than a century, air transport has revolutionized the movement of people and goods. Around the world, it has also become a critical economic and social driver. By connecting people and markets, the aviation industry not only directly benefits the economy, but it also facilitates the growth of many other important sectors. The National Airlines Council of Canada (NACC) is a trade association whose members are Canada's four largest air carriers – Air Canada, Air Transat, Jazz Aviation LP and WestJet. Together, these four represent 87 per cent of the domestic traffic market share and 64 per cent of total airline traffic in Canada, carrying 60 million passengers each year to more than 200 locations in Canada and around the world.

But while airlines bring us closer together, doing so cost-effectively has been an ongoing challenge. In fact, since the start of commercial air travel early in the 20th century, more than 400 airlines have gone out of business in Canada and the United States alone. And, in recent years, there has been a steadily growing focus on the environmental costs of air travel.

Today, successful airlines, including the NACC members, are all about efficiency. They recognize the need to reduce fuel consumption and aviation emissions, and look to innovation as a means of achieving this over the long term. They also recognize that airlines cannot achieve these goals in isolation from aviation stakeholders. NACC, therefore, supports the need for a global sector approach as a way to truly address the international nature of aviation. Without it, ineffective approaches, such as regional market mechanisms (showing up as local taxes and charges, or regional emission trading schemes), create a distorted playing field and inhibit the sector's ability to invest in its own solutions for CO_2 emission reductions.

One of the key approaches to improve fuel efficiency that Air Canada, Air Transat, Jazz and WestJet have adopted is to focus on renewing their fleets. NACC carriers have spent billions on new aircraft that feature more efficient engines, better aerodynamics and advanced materials that reduce weight. They have also been instrumental in spearheading Area Navigation (RNAV) and, more recently, Required Navigation Performance (RNP) procedures in Canadian airspace to fly their aircraft as fuel efficiently as possible. In addition, they continue to work with Transport Canada and Nav Canada to transform Canadian airspace into a global leader for efficient operations.

While these changes contribute to the airlines' economic vitality, the travelling public and the environment also stand to gain. The public benefits from pricing that has remained competitive thanks to increased efficiency, which allows more people to travel more often. Airfares, adjusted for inflation, have not increased materially in more than a decade.

Another public benefit is that the airline industry's financial interest in consuming less fuel dovetails with society's greater goal of reducing greenhouse gas (GHG) emissions.

In recent years, the industry has made great strides in improving its efficiency. In 2008, the Canadian aviation industry accounted for 5 per cent of domestic emissions from transportation and only 1 per cent of total Canadian emissions[1]. Globally, the industry accounts for approximately 2 per cent of all fossil fuel related emissions.

Still, while the industry is a relatively small contributor to GHG emissions, it is a highly visible one. The NACC member airlines fully recognize the potential environmental impact of aviation and are committed to conducting their activities in an environmentally responsible manner. They are working towards the collaborative industry goals that the International Air Transport Association (IATA) set for its member airlines worldwide with the overall goal to drive fleet fuel efficiency, stabilize carbon emissions and achieve absolute emissions reductions.

NACC MEMBER AIRLINES

In Canada, the aviation industry plays an especially important economic and social role, given the country's size and its distance from many key international markets. Its airlines are a major source of earnings, tax revenue, jobs and investment opportunities all across the nation, and are vital to the success of many Canadian industries. The industry also helps connect Canadians and their communities from coast to coast to coast. In 2008, Canadian residents and visitors spent over $15 billion on domestic passenger air travel. That same year, international passengers spent $2.6 billion on Canadian airfares.

Reducing the industry's environmental footprint is top of mind in everything the NACC carriers do. Each of the four airlines has a multi-pronged approach to reducing emissions, working on such areas as upgrading their fleets, improving fuel efficiency, reducing noise, recycling and material management.

As part of our commitment to reduce aviation emissions, in June 2005, Canada became the first jurisdiction in the world to achieve a joint government-aviation industry voluntary agreement. The Canadian airline industry and Transport Canada signed a voluntary Memorandum of Understanding (MOU) to reduce GHG emissions per unit of output from aviation in Canada.

NACC's member airlines strongly support this agreement and, in 2008, they exceeded the MOU target for 2012 by 6.1 per cent. This represents an overall improvement of 28.6 per cent from the Canadian baseline year, 1990. They continued to work towards collectively reducing their fleets' GHG emissions on a per-unit basis. In 2010, NACC carriers achieved an efficiency of 37.5 litres per 100 revenue tonne-kilometres for a 31 per cent cumulative improvement compared to the 1990 baseline or an average of 1.6 per cent per year.

1. Environment Canada, "2010 Emissions Trends"

UNDERSTANDING FUEL EFFICIENCY AND AVIATION

FUEL AS AIRLINES' #1 COST

With jet fuel as their largest expense, airlines are intrinsically driven to become more fuel-efficient. And while this is crucial for their economic viability, it also contributes to their key goal of reducing emissions, creating a "win-win" scenario.

WHAT IS FUEL EFFICIENCY AND HOW IS IT MEASURED?

Fuel efficiency, very simply, is output per input. In aircraft, fuel efficiency can be measured in many ways, but the internationally agreed-upon unit for emissions reporting is litres/100 revenue tonne-kilometres (L/100 RTK) – the volume of fuel burned to carry total payload (weight of people, luggage, cargo). In 2010, the NACC member airlines had an L/100 RTK of 37.5, so 37.5 litres were required to fly one revenue tonne 100 kilometres.

Similar to motor vehicles during highway driving, aircraft are most efficient at cruise speeds. Factors such as long taxiing, takeoffs, noise abatement procedures and "dive and drive" descents burn comparatively more fuel (like city driving or accelerating) and therefore increase emissions.

FUEL EFFICIENCY AND EMISSIONS

Overall, the aviation industry is actually a relatively small contributor to GHG emissions. However, because of the projected growth of the sector, aviation has become a major focus in the international climate change debate. For their part, NACC members continue to institute policies, procedures, programs and projects, and work with the federal government to either improve aircraft efficiency or reduce fuel burn, thus reducing carbon dioxide (CO_2) emissions.

NACC IN THE GLOBAL CONTEXT

The United Nations' International Civil Aviation Organization (ICAO) is leading a global sectoral approach to reduce international aviation GHG emissions. ICAO is the agency in the unique position to garner cooperation and support between governments and all members of the aviation sector. That is what is truly needed to achieve progress on aviation GHG reductions in an effective way. For example, certain infrastructure and air traffic management efficiency improvements depend on direct government investments that industry does not control.

NACC recognizes, supports and advocates ICAO as the appropriate body to set the framework for a global sector approach. Furthermore, the airline industry through the International Air Transport Association (IATA) has adopted a set of ambitious collective targets for aviation emission reductions. No other industry has made such commitments on a global level. Uniformly endorsed by the IATA airlines, these targets are:

- a cap on aviation CO_2 emissions from 2020 (carbon-neutral growth)
- an average improvement in fuel efficiency of 1.5 per cent per year from 2009 to 2020, and
- a reduction in CO_2 emissions of 50 per cent by 2050, relative to 2005 levels.

IATA utilizes the following four-pillar approach to achieve GHG reductions towards these targets:

- improved technology (e.g., fleet renewal, biofuels)
- operational efficiencies
- infrastructure improvements (e.g., air traffic and air navigation systems), and
- positive economic measures.

NACC carriers support the IATA GHG reduction targets and are aligned to follow the four-pillar approach. The industry cannot achieve GHG reduction targets without a joint and effective approach that includes all members of the sector, involving the aviation supply chain through to governments.

CANADIAN CONTEXT

Comparing the state of the Canadian air industry's fuel efficiency to that of other countries is a bit like comparing apples to oranges. The context varies greatly because each country's particular operational environment can be extremely different. As for the Canadian industry, the fuel efficiency improvement goal set out by the industry and Transport Canada MOU is to reduce litres of fuel per revenue tonne-kilometre (L/RTK) by an average of 1.1 per cent a year, with a cumulative improvement of 24 per cent by 2012, compared to the 1990 base-case scenario.

NACC members exceeded the Canadian MOU target for efficiency improvement ahead of schedule. From 2005 through 2008, members had achieved an efficiency improvement in L/RTK of 3.2 per cent or an average of 1.1 per cent per year. By 2008, members had exceeded the MOU target for 2012 by 6.1 per cent. This represents an overall improvement of 28.6 per cent from the Canadian baseline year, 1990. In 2010 NACC carriers achieved an efficiency of 37.5 litres per 100 revenue tonne-kilometres for a 31 per cent cumulative improvement compared to the 1990 baseline or an average of 1.6 per cent per year.

NACC carriers believe that improvements in air traffic management (ATM), particularly in Europe and the United States, will provide further operating efficiencies and significant fuel savings.

FUEL-SAVING INITIATIVES SAVE MILLIONS OF LITRES

All four NACC carriers now engage in multiple measures to save fuel. Air Canada, for one, estimates that, excluding its engine washing program, its other fuel-saving initiatives resulted in a saving of 17,800,000 litres of fuel in 2010. That resulted in an estimated reduction in CO_2 emissions of 45,100 tonnes.

"ATM enhancements could improve fuel efficiency and CO_2 emissions by up to 12 per cent." (IATA)

DRIVERS TO IMPROVING FUEL EFFICIENCY

CHANGES CUT FUEL CONSUMPTION

Air Transat has implemented a program to identify and correct aircraft defects that increase aerodynamic drag and thus, fuel consumption. This is done during scheduled maintenance. They also changed their tires to lighter-weight models to reduce weight and, therefore, fuel consumption.

INVESTING IN FLEETS

The commitment by NACC members to reducing emissions is perhaps best demonstrated by their substantial investments in new, more efficient aircraft for their fleets – the most effective means of reducing emissions. From 2005 to 2010 inclusive, they invested a total of $12.5 billion in their fleets.

It is expected that, from 2011 through 2020, NACC carriers will spend another $13.7 billion on new aircraft, bringing their total investment in new aircraft from 2005 to 2020 inclusive to $26.1 billion.

Many factors must be considered before integrating new or updated technologies such as new engines into an existing fleet plan. These include the impact on maintenance, costs of equipment and training requirements.

Aircraft Design Improvements
In the past 40 years, advances in reducing fuel consumption have led to substantially lower emissions levels. In large measure, this is the result of improvements in engine and airframe designs and the introduction of new technologies. The continuing demands of NACC members and airlines around the world have prompted the manufacturers of their aircraft and engines to improve efficiency.

Overall GHG emissions have decreased substantially as new technologies and the improvement of existing technology have increased engine efficiency. About 40 per cent of the fuel savings have come from engine improvements and about 30 per cent from advancements in the airframe design, including better aerodynamics and lighter but stronger composite materials, such as carbon fibre.

Aircraft Modification and Maintenance Activities
It is a given that new airplanes have state-of-the-art efficiency improvements incorporated during production. In addition, NACC operators are continuously looking for ways to adapt these evolving technologies into aircraft already in service. Operators have therefore made many physical modifications to their aircraft fleets, which have had a positive effect on the industry's overall carbon footprint. These modifications include:

Aircraft tires: Two member companies have installed lighter-weight tires on certain models of their aircraft, providing ongoing benefits.

Aerodynamic drag: As part of their regular maintenance programs, member companies inspect their aircraft to identify and minimize aerodynamic drag, thus improving fuel efficiency. In 2009, one company initiated a project to study the modification of NACA fuel vents to reduce drag.

Composite materials: In the interests of reducing weight and, thus, fuel consumption, one ongoing area is the use of composite materials in aircraft frames. And they not only cut aircraft weight; they also boost their strength. Using composites in one new aircraft type has cut its weight by 20 per cent.

Engine washing: All member companies have instituted regular internal washing of engines to improve performance, resulting in better fuel efficiency. This provides ongoing fuel efficiency benefits of approximately 1.2 per cent.

One carrier is currently installing **Enhanced Performance (EP) kits** on one of its engine types to reduce fuel consumption and therefore emissions.

Paint: It is hard to imagine that paint weighs much, but aircraft paints are now available that weigh 10-20 per cent less than what has been traditionally used. In a related move, new lighter coatings are being developed to better resist chipping and cracking.

Wing tips: Wing-tip treatments and extensions commonly referred to as winglets have done much to improve wing design aerodynamics. By installing winglets on its aircraft fleet, one carrier was able to obtain fuel savings of up to 2.7 per cent per flight. Today, many new aircraft incorporate wing-tip technologies that are as effective as winglets.

Projected Improvements

It is projected that, from 2011 through 2020, traffic growth, measured in revenue tonne-kilometres (RTK), for the NACC carriers will be approximately 16 per cent. But it is also projected that the amount of fuel burned will only increase by 10 per cent because of improved fuel efficiency stemming from the introduction of new aircraft. This will mean a saving of 300.66 million litres of fuel or 0.76187 million tonnes of CO_2 emission reductions. Some improvements to watch for in the near future include:

Lighter components: Reducing weight by replacing heavy interior components – seats, lighting and electrical systems, for example – with lighter versions can noticeably reduce fuel consumption. Even addressing what may seem to be minor flaws in the exterior of aircraft – chipped paint, scratches, etc. – can cut an aircraft's annual fuel consumption by 0.5 per cent.

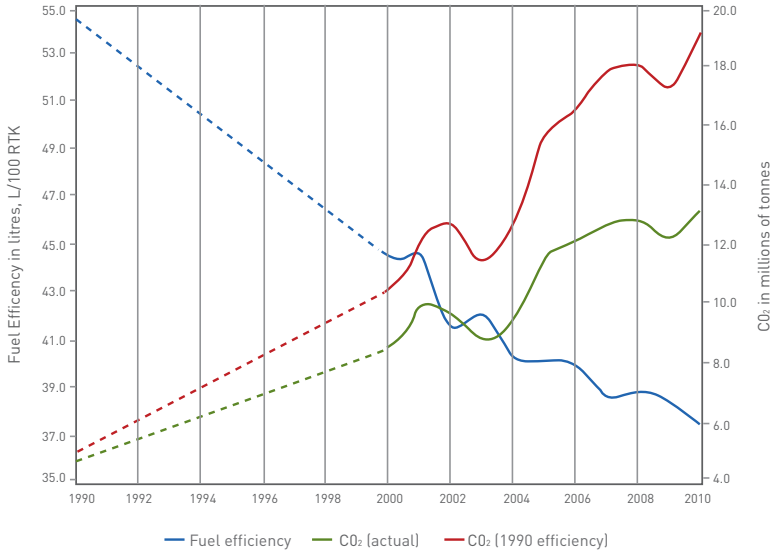
INVESTING TO REDUCE

WestJet invested over $2 billion between 2001 and 2010 on its fleet of Boeing Next-Generation 737-series aircraft. It now has one of the youngest and most fuel-efficient fleets in North America. Boeing data show that emissions from WestJet's Next-Generation 737 aircraft are approximately 15-30 per cent lower on a per seat basis than the fleet of aircraft it replaced between 2000 and 2003.

EFFICIENCY IMPROVEMENTS

Air Canada's fuel efficiency at the end of 2010 was 70 per cent better than it was in 1970.

FIG. 1. CO_2 SAVED WITH EFFICIENCY GAINS BETWEEN 1990 AND 2010



The red line in the above graph represents the amount of emissions that would have been generated if the airline industry had continued to operate at its 1990 efficiency level over the period and not improved its efficiency as it did. The difference between the red line and the blue line is the amount of emissions reduced as a result of improving efficiency.

Projected Advances in Technology

There are some exciting developments on the horizon in aircraft manufacturing that could be put into service within the next decade or so. Among the most promising are:

Open-rotor engines: would mean the return of propeller-driven engines on larger aircraft – with a difference. This modern version would involve two high-speed propellers, spinning in opposite directions, that would make faster flight speeds and lower noise levels a reality. It is expected that these engines will burn 25-30 per cent less fuel than today's engines, while meeting noise standards. These engines could be ready to use on some aircraft by 2020.

Advanced high-bypass turbofans: an engine that delivers the low maintenance costs expected for high frequency flights from narrow body aircraft, while managing risk. This design could be ready to use by 2016, and result in up to 16 per cent lower fuel consumption than current engines and a 75 per cent reduction in noise.

Geared turbofans: used in smaller aircraft engines, this technology could be applied to narrow body commercial aircraft by 2013, resulting in a 15-20 per cent increase in efficiency over current engines. In this type of engine, the fan section operates at a slow speed and the low-pressure compressor and turbine operate at much higher speeds – increasing engine efficiency and lowering fuel consumption, emissions and noise levels.

MAKING OPERATIONAL CHANGES

Improvements in operational procedures, including developments in navigation, have also contributed to overall fuel efficiency. The NACC member companies have instituted many improvements in aircraft operations over time to reduce their CO_2 emissions. These changes are in the areas of training, flight planning/aircraft dispatch and aircraft operating procedures and they continue to provide ongoing benefits.

Performance-Based Navigation (PBN) and Air Traffic Management (ATM)
NACC considers Performance Based Navigation (PBN) to be the airline industry's best proven means of markedly enhancing environmental performance and reducing fuel consumption and emissions. NACC has been instrumental in advancing its implementation in Canada.

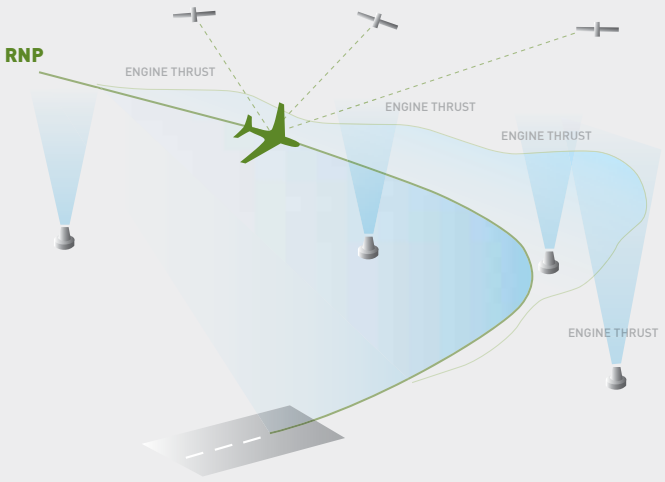
With improvements in air traffic management (ATM) planned in jurisdictions such as Europe and the United States, further operating efficiencies and significant fuel savings can be achieved. We need the federal government to play a key role in advancing such improvements by engaging in further discussions with its U.S. and European counterparts.

PBN is a shift from traditional airspace usage where aircraft travel designated corridors, based on radio navigation aids, to a system where aircraft fly more directly "as the crow flies". It is sensor-based navigation, rather than radio-based, that can be applied to air traffic routes, instrument procedures and defined airspace. As the basis for the design and implementation of automated flight paths, airspace design and obstacle clearance, PBN allows the aircraft to determine its own ability to safely achieve performance based on the Area Navigation (RNAV) and Required Navigation Performance (RNP) that have been established.

OZONE SCRUBBERS

Jazz Aviation installed Ozone Scrubbers on its CRJ 705 aircraft fleet, which eliminated flight-level restrictions and allow the aircraft to fly at higher, more optimum altitudes. This results in reduced fuel burn.

FIG 2. UNDERSTANDING RNP
With RNP, pilots no longer need to depend on directions from air traffic control on the ground – or inefficient "dive and drive" approaches to the airport. Instead, they can use the aircraft's own advanced navigation system combined with a global positioning system for a more fuel-efficient and direct approach to the airport.



And PBN goes beyond improving safety, reliability, accessibility and efficiency; it can also do much to reduce the environmental impact of air operations through route placement, fuel efficiency and noise mitigation.

One NACC carrier has estimated that using PBN for its narrow body fleet of aircraft would save approximately three million litres of fuel annually, not including operations into Vancouver, Toronto and Montreal airports.

For the combined fleets of NACC member carriers, implementing RNP would save an estimated six million litres in fuel annually, with reductions of 15,200 tonnes of CO_2 emissions. This does not include other carriers or foreign operators.

Other Operational Measures
Other measures that have contributed to reducing the NACC airlines' CO_2 emissions include:

Potable water projects have optimized the amount of potable water carried on flights. Historical usage data per route was analyzed and now water carriage requirements are based on specific routes.

The **APU**: The auxiliary power unit (APU) runs on fuel and meets the power requirements of an aircraft when it is on the ground and the engine is off. It may be used for air conditioning or lighting, for instance. Now, many airports are offering aircraft ground-based electrical supply to cut down on fuel use and carbon emissions.

A project is **reducing APU** use in favour of more efficient ground power and air conditioning. Whenever possible, only one air conditioning pack is used during operation of the APU on the ground to reduce fuel burn.

CG location: A process to optimize the location of the centre of gravity (CG) through a better distribution of passengers in the cabin whenever the load factor is below 90-95 per cent. This has a direct influence on fuel burn during the climb and descent portions of the flight.

A process to **reduce gate arrival delays** will cut the amount of time arriving aircraft are held off gate, thereby reducing fuel burn and emissions.

Using idle reverse and braking on landing – rather than selecting maximum reverse thrust – is being used as a fuel-saving measure.

A project has been completed to **refine the calculation for determining the amount of reserve fuel carried** for close-in alternate airports to ensure it reflects actual flight distance. This ensures aircraft do not carry fuel exceeding the regulatory requirement.

Processes for conducting internal fuel audits to regularly examine all areas of the operation have been implemented to verify effectiveness of fuel-saving policies and procedures.

The process to provide **more accurate taxi fuel measurement** to allow for improved flight planning has been implemented and data relating to this is being updated continually.

Projects to **more accurately determine the zero fuel weight for aircraft** are complete or ongoing. The aim is to determine the true weight of the aircraft, including passengers and cargo, with a higher level of accuracy over existing methodology. One member has implemented the process for its Canadian and European operations and will expand it to the rest of its network.

Cruise speeds for new aircraft fleets are continually refined to optimize fuel efficiency.

Training: Changes in training airline personnel promise to have a long-term effect in reducing the airlines' CO_2 emissions. They include presenting and explaining Cost Indexing (the optimization of time cost and fuel cost) in recurrent ground-school classes; a new fuel conservation training program for pilots and key personnel involved in aircraft operations; and additional fuel guidance based on historical operations for dispatch personnel.

Flight Planning/Aircraft Dispatch: Flight planning systems have been purchased, introduced or refined to increase efficiency and reduce fuel costs through improved calculations of taxi, holding and contingency fuel and optimization of flight profiles, aircraft speed and use of cost indexing. As well, the refinement (removal and/or adjustment) of all fuel burn factors imbedded in the flight plan BURN calculation has been completed.

Dispatch route optimization is an ongoing, daily activity.

Required Navigation Performance and Area Navigation (RNP RNAV) departure and approach development and implementation are ongoing.

Airspace Redesign Projects with Nav Canada are ongoing.

Creating a **Fuel Efficiency Key Performance Indicator** in combination with current Aircraft Performance Monitoring Program is ongoing.

Refinement of Cost Indexing is ongoing to determine the most economical speed for operation of the aircraft for each route flown. Phase 1 of the project has been completed and is being expanded to incorporate a larger proportion of the carrier's network.
The following aircraft operating procedures have all been incorporated into the respective members' standard operating procedures:

- Employing single engine taxi-in and taxi-out procedures when conditions permit
- Limiting APU usage on ground to 10 minutes on arrival and 20 minutes before departure at North American and European destinations
- Reducing fuel consumption during the first 3,000 feet of climb by using ICAO's NADP2 takeoff climb procedure, and

• Utilizing Econ climb profile, which reduces fuel burn by accelerating to enroute climb speed as soon as flap retraction is complete.

Cargo and Baggage Operations

• One member replaced wooden skids with lighter composite ones. Previously, it had switched from aluminum cargo containers to ultra-light Kevlar containers. The airline has also developed and instituted a program to maximize the number of bags per baggage container, thus reducing the number of baggage containers per flight. These weight-reducing activities provide ongoing benefits.

• Another member is also replacing its aluminum-constructed cargo containers with ultra-light Kevlar ones.

• One member has modified its loading procedures to optimize the use of bulk holds on its aircraft.

Inflight/Catering

NACC member companies continue to modify their inflight/catering services to reduce the overall weight of the aircraft. Changes made or projects initiated by at least one member carrier include:

• Optimizing carriage of service items on board – reducing return catering, matching catering provisioning with actual requirements and eliminating/minimizing items such as headsets, ice, magazines, newspapers and substituting lighter-weight products wherever possible. Periodic audits are conducted to avoid carrying excess quantities.

• Initiating a study replacing existing galley carts with new lighter-weight units, and

• Removing the ovens from the aft galley of one of its single-aisle aircraft fleet along with infrequently used trash compactors from one of its wide-body aircraft fleet.

AIRCRAFT NOISE AND EMISSIONS

There is a known trade-off between noise abatement procedures and emission reduction initiatives. Noise abatement procedures were developed in the mid-'70s, and, since then, aircraft have become much quieter and their noise impact on communities is far less severe.

NACC continues to strive for a balanced approach, engaging stakeholders to ensure that emission reduction initiatives can be achieved while still minimizing the impact of noise on affected communities.

- "Thanks to technology, today's aircraft are 50 per cent quieter than they were 10 years ago." (IATA)
- "The number of people exposed to aircraft noise worldwide has gone down by about 35 per cent between 1998 and 2004." (IATA)
- "Today, commercial aircraft are more than six times quieter than they were 40 years ago." (Air Transport Association [ATA])
- "The FAA recently noted that, since 1975, there has been a 94 per cent reduction in the number of people exposed to significant aircraft noise in the United States while the number of passengers our airlines have transported has tripled." (ATA)

"Thanks to technology, today's aircraft are 50 per cent quieter than they were 10 years ago." (IATA)

SUSTAINABLE ALTERNATIVE FUELS

CHALLENGES

Despite commercial aviation currently contributing only 2 per cent of emissions from manmade sources, NACC members are still ambitiously engaged in reducing GHG emissions even further. As well, if one factors in the projected growth of aviation, CO2 emissions could potentially grow from 2 per cent to 5 per cent by 2050. While tremendous fuel efficiency improvements have been achieved by the carriers over the last 25 years, the gap is narrowing as to how big these advancements can be in the future.

As a result, NACC carriers and the airline industry at large are actively supporting the development of sustainable alternative fuels as a means to further reduce aviation emissions globally. The challenge is to ensure sustainable aviation fuels are developed that demonstrate a lower emissions profile as compared to conventional fuels, do not compete with important feedstock (such as food crops) and are economically viable.

A WAY FORWARD

NACC carriers support the development and use of sustainable alternative aviation fuels as a potential way of further reducing our carbon footprint. Alternative fuels can be derived from a surprising range of materials.

Sustainable aviation fuels have been certified for use in aircraft and are already being used by certain carriers elsewhere in the world on a trial basis. It is expected they could be used for commercial flights by Canadian air carriers within the next few years, provided there is an adequate supply.

Why We Need Them

The fuel efficiency of modern aircraft has come a long way in the past four decades. And the technological and operational improvements the Canadian air carriers have adopted have helped further reduce their fleets' emissions.

Still, the expected growth in the number of air travellers in coming years will further challenge the industry's environmental gains. That is why we need to look beyond current measures to using sustainable alternative fuels that will produce lower GHG emissions. NACC carriers will only be able to achieve their goal of further significant emission reductions once the use of sustainable alternative fuels becomes viable.

What We Are Doing

Great advances are being made in the move toward a sustainable and lower net carbon aviation fuel, with ongoing tests of these biofuels made from fast-growing, non-food sources such as algae and jatropha. Canadian carriers are engaging in collaborative efforts with industry partners and organizations to cultivate and support sustainable aviation fuel development and production. They are gathering and sharing information, both internally and

with other airlines globally, to identify criteria around carbon life cycle analysis, sustainability criteria and commercially viable requirements to support the industry.

Certain airlines working with aircraft and engine manufacturers are already using biofuels on a trial basis in their operations and Canadian carriers are working towards the development of sustainable alternative aviation fuels for use in Canada.

What Needs To Be Done

In order to develop and support viable sustainable aviation fuels for Canadian carriers, a policy framework at the government level needs to evolve in Canada. The federal government needs to assume a leadership role and collaborate with stakeholders in developing a viable framework for advancing research and development (R&D), the commercialization and the introduction of sustainable alternative aviation fuels into the Canadian supply chain.

EFFICIENT AIR TRAFFIC CONTROL

Through their individual fleet renewal programs, NACC carriers have equipped their aircraft with technologies that allow them to fly highly advanced operational procedures. These advanced procedures, in turn, minimize GHG emissions. In the United States and Europe, airlines can take full advantage of these advanced technologies. In Canada, however, they cannot.

For Canada and the NACC carriers to remain competitive, Transport Canada needs to introduce regulation for International Performance-Based Navigation Standards, such as U.S. Federal Aviation Administration (FAA) Orders 8260.52 and 8260.54a, which cover the design criteria of RNP approaches. Transport Canada could then approve PBN regulations enabling Nav Canada to work with NACC carriers to develop and implement procedures as efficient as those currently in use in the United States and Europe.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