



FUEL AND EMISSIONS EFFICIENCY CHECKLIST

Purpose: IATA recognizes that fuel management strategies form a key component of the commercial advantage that airlines have established over many years. The purpose of this checklist is to allow airline management to audit their current fuel management practices, to ensure that they are taking advantage of all generally available avenues to reduce fuel expenditure, within the bounds of safety. It is intended for **internal audit purposes only** – i.e., the information is not intended to be returned to IATA, shared with other airlines, nor used in any way other than as a “**self-check**”.

It is likely that most airlines are already applying many, if not all, of the techniques identified here. Some may not apply to your particular mode of operation. In some cases, however, even one or two of the items raised could have significant benefit to your airline, and we would encourage you to seek further information on these techniques.

Supporting this checklist, IATA is collating “best practice” guidance information on each of these topics, and will progressively make that available directly to each of our member airlines on-line through the next two months at www.iata.org/fuelaction, and in assembled hard copy format by December 2004. This will help you to identify the benefits of adopting specific initiatives.

NOTE: This checklist is provided to allow airlines to identify potential areas for fuel and environmental efficiency, and is not meant to imply that any action should be taken until further research has been undertaken, appropriate risk and safety evaluation conducted, regulatory authority obtained, and relevant airline policies, practices, or documentation amended.



	Checklist Item	Internal Comments/ Internal Action
1	THE SCHEDULE	
1.1	Is your airline schedule built for maximum fuel efficiency, optimized speeds, and best Cost Index values (Time cost versus fuel cost)?	
1.2	How often is your schedule (flight times and Cost Index) adjusted to cater for fuel prices changes?	
1.3	Are your Cost Index values adjusted for specific routes?	
1.4	Is your schedule adjusted for seasons, time of day, day of the week?	
1.5	Are you using the right aircraft on the right route to minimize fuel consumption per passenger?	
1.6	Do you have a process to perform aircraft swaps based on last minute load changes?	
1.7	Is your schedule minimizing aircraft positioning or ferry flights?	
1.8	Do you have an early departure policy for overskied flights that would permit the use of a lower Cost Index and still arrive on time?	
1.9	Is Cost Index flight planning and flying available for your non-FMS aircraft types or other aircraft types?	
1.10	Are high overflight charges causing inefficient fuel planning?	



2	MISSION PLANNING AND COST OPTIMIZATION	
2.1	Are you properly and effectively managing the curfews, early morning holds, and so on?	
2.2	Are you attempting to slow down early arriving flights to prevent gate-holds and ramp congestion and reduce fuel consumption?	
2.3	Do you track gate-holds to prevent gate holding short of the gate with engines running, and therefore minimize fuel burn on the ground?	
2.4	Are some routes unnecessarily [flight plan] altitude capped?	
2.5	Are your dispatchers adding fuel for ad-hoc reasons? <i>(such as night shift, workload, shift changes, specific captains, to avoid calls from the crews, preferences, seat of the pants feelings, habits, don't trust the forecaster, etc)</i>	
2.6	Do you have a well-defined and clear Fuel Policy? <i>(Usage of available fuels with purpose for each type of additional fuel, Captain's authority to manage the fuel, efficient fuel reserves, well define categories of discretionary fuels, minimum FODs, fully integrated in the flight planning system, specific guidelines for alternate selection, crew fuel additives, taking advantage of modern aircraft and airport facilities, holding fuel guidelines, unusable fuels, use of minimum reserve fuel, use of alternate, taxi fuel calculations, cost to carry additional fuel information, etc.)</i>	
2.7	Do you have a recommended arrival fuel for each airport over which dispatchers and pilots should look for opportunities?	
2.8	Are additional fuels itemized on the flight plan ? <i>(ATC delays, Captain's request, MEL, Weather enroute, ETOPS, etc.)</i>	



3	GROUND TRAINING ON AIRCRAFT PERFORMANCE AND EFFICIENCY	
3.1	Are all of your pilots up to the same standard regarding aerodynamics and fuel-efficient flying? Do you train pilots and dispatchers on the fuel policy?	
3.2	Are the crews trained on efficient FMS programming to cross check the flight plan fuel and accurately manage the fuel in -flight?	
3.3	Are all the training captains, line introduction pilots, check pilots, simulator instructors fully conversant with the latest fuel saving techniques, and do they support an efficient fuel management program?	
3.4	Are fuel-saving techniques introduced at initial training, or conversion training? Are these techniques reviewed at the annual training sessions?	
3.5	Do all of your chief pilots and upper managers support efficient fuel management?	
3.6	Do you publish the potential savings associated with reducing flight time by one minute, saving 100 kg of fuel, the cost to carry 100 kg extra on each flight, fuel prices, etc?	
3.7	Do you have statistics on diversions? <i>(Flight diversions today are around one in 1,000 flights and are about 33% for mechanical, 33% for medical reasons, THE LAST 1/3 for weather reasons. Most diversions are to an airport other than the planned alternate.)</i>	



4	ALTERNATE SELECTION PROCESS	
4.1	Is your alternate selection process optimized to minimize cost and according to the risk level?	
4.2	Do you take maximum advantage of the aircraft technological capabilities and destination approach facilities during flight planning?	
4.3	Is your flight-planning system using the lowest possible fuel burn for alternate fuel requirement calculations?	
5	STATISTICAL FUEL BOARDING AND FUEL CONTINGENCIES	
5.1	Do you board additional fuel according to accurate statistics, and are your airport demand charts properly optimized? Do you assign the most fuel economical aircraft to longer routes?	
5.2	Do you have validated data available to support such a system?	
5.3	Is discretionary fuel added for foreseeable delays, or for comfort? <i>(Fuel should be added when there is a strong possibility of it being used)</i>	
6	RECLEARANCE AND REDISPATCH	
6.1	Is the re-clearance or re-dispatch technique used for longer-range flight to minimize fuel burn and optimize payload?	



7	TANKERING	
7.1	Do you have a tankering program in place, and is it well optimized?	
7.2	Is your flight planning system properly computing tankering costs?	
7.3	Is the "cost-to-carry" computed by your flight planning system?	
7.4	Do you use strategic tankering and are the costs well understood?	
7.5	How often do you update fuel prices in your flight planning system?	
8	FUEL MANAGEMENT INFORMATION [MI] DATABASE	
8.1	Is your Fuel MI Database accurate and detailed, and is it comparing actual to flight planning data?	
8.2	Do you have a full time Fuel Program Manager or Fuel Database Manager? Is that person operational i.e., a pilot or dispatcher?	
8.3	Do you use the information properly and distribute it to appropriate stakeholders?	
8.4	Do your stakeholders understand and use the Fuel MI data to improve fuel efficiency?	



9	FUEL EFFICIENCY TRACKING AND CONTROL USING THE FUEL MI DATABASE	
9.1	Do you conduct post-flight analysis of arrival fuel and time performance?	
9.2	Do you have a fuel-efficiency monitoring program for pilots?	
9.3	Are fuel performance statistics and feedback made available to your flight crews?	
9.4	Do you have a fuel-performance tracking program for dispatchers?	
9.5	Do you maintain accurate fuel burn data for each specific aircraft?	
9.6	Do you have a system or program to monitor fuel inefficient aircraft and/or engines?	
9.7	Do you have a maintenance program to minimize burn for fuel inefficient aircraft e.g., engine wash, surface condition and cleanliness, aircraft paint?	
9.8	Is the individual aircraft fuel performance regularly updated in your flight planning system?	
9.9	Do you regularly monitor and analyze excessive "Fuel over Destination (FoD)"?	
9.10	Do you monitor over-fueling by re-fuelers or flight crews?	
9.11	Do you monitor and analyze the costs of adding high amounts of discretionary fuel?	
9.12	Do you monitor the cost of using unnecessarily distant alternates?	
9.13	Do you have a no-alternate IFR policy and is it properly used?	
9.14	Are your Chief Pilots and other stakeholders accountable for a fuel-efficient operation?	



10	WEIGHT MANAGEMENT	
10.1	Do you have a program to manage aircraft weight? <i>(such as minimizing the carriage of unnecessary water, magazines and newspaper, toilets servicing, blankets, cargo containers, crew baggage, carry on baggage, unnecessary galley supplies, ovens, garbage, etc)</i>	
10.2	Do you have a center of gravity management system for passengers and cargo (C of G)?	
10.3	Are your estimated zero fuel weights accurate (EZFW)?	
10.4	Do you have a last minute fuel top-up policy especially for long-range flights to avoid carriage of unnecessary fuel? <i>(The flight plan is re-optimized for actual weight changes (passengers or cargo), winds, cruise speed and altitudes, connections, dropping of choosing a more efficient alternate, re-optimizing the discretionary fuel, slowing down early flights for fuel efficiency, etc.)</i>	



11	FUEL MANAGEMENT BY CREWS	
11.1	Do you have adequate flight-planning guidelines on fuel management and boarding of additional fuel, for flight crews?	
11.2	Do you have a clear policy on the alternate selection process? Do you take maximum advantage of aircraft and airport technology? <i>(CAT II, CAT III auto-land, better forecasting, traffic information, statistics, etc)</i>	
11.3	Do you have an education and sensitization program on the boarding of additional discretionary fuel, the use of statistical discretionary fuel, alternate selection process and flight planning system optimization?	
11.4	Do you have adequate methods of cross-checking the fuel required for the flight (FMS cross check, etc.) to avoid unnecessary last minute requests for additional fuel?	
11.5	Is access to detailed planning information available during flight planning? <i>(Weather charts, satellite photos, airport traffic information, communications with Dispatch, etc)</i>	
11.6	Are airport traffic information and statistics available at flight planning stations? <i>(Airport demand charts, etc.)</i>	
11.7	Do you have guidelines regarding APU management and cost information (electrical, bleed management) for crews and ground staff?	
11.8	Do you have sufficient ground equipment available (GPU, Gate power supply, air conditioners)?	
11.9	Do you have an early departures procedure when passengers boarding and baggage loading are completed? <i>(This enables the use of a lower Cost Index (speeds) or minimizes the need for higher speeds for oversked flights)</i>	
11.10	Do you have efficient start-up and taxi-out procedures?	
11.11	Do you have adequate guidelines for taxi speed management?	



11.12	Do you have proper and efficient engine-out taxi SOPs?	
11.13	Do you have a policy and guideline on departure runway selection and intersection departures when feasible?	
11.14	Do you have a specific guideline on the most efficient flap setting for takeoff?	
11.15	Do you have a rolling take off policy to reduce fuel consumption, noise and emissions?	
11.16	Do you have proper guidelines on efficient departure profile management using speed versus altitude trade-off, including best bank angle for efficient turn radius while minimizing departure procedure distance? <i>(Use best angle climb speed if heading away from intended course. Determine if distance or altitude is the restriction)</i>	
11.17	Do you retract the flaps (clean up the aircraft) as soon as possible on departure?	
11.18	Do you have specific SOPs regarding the efficient use of engine and airframe anti-icing?	
11.19	Do you have optimized climb speed profiles taking weight and winds into consideration? Do you have appropriate guidance?	
11.20	Do you re-optimize the Cost Index after departure to save fuel for the early arrivals?	
11.21	Do you have an overweight landing procedure to avoid fuel dumping?	
11.22	Do you have a post-departure policy on re-optimization of mission profile and flight plan - based on estimated arrival time (acceleration and slowdown), zero fuel weight change, etc?	
11.23	Do you have passenger connection management program (Operations Control) and only accelerate the flights where there is some commercial value or when there is some tactical advantage in doing so?	
11.24	Do you have specific guidelines on Flight Management System (FMS) winds and temperatures insertions?	



11.25	Do you have a well-defined air conditioning systems management procedure for best fuel efficiency while maintaining passenger comfort?	
11.26	Do you have precise crew SOPs on adherence to flight planned cruise speeds, altitudes and planned routing including guidelines for tactical decisions?	
11.27	Do you have a procedure for altitude management for short sectors?	
11.28	Do you have proper flight control trimming guidelines for applicable aircraft types?	
11.29	Do you have a step climb policy for oceanic flight segments and is the flight planning system catering to OCA step climbs procedures?	
11.30	Do you have a speed optimization process to determine the most efficient Mach number for flights into fixed Mach areas?	
11.31	Do you have guidelines on enroute flight profile management by crews including proper guidelines and training for altitude and direct routing management?	
11.32	Do you have a procedure to minimize the distance travelled when deviating for weather?	
11.33	Do you provide accurate winds and temperatures for the next usable flight levels above and below the flight planned altitudes?	
11.34	Do you consider using less than maximum number of air conditioning packs or reduced pack flow with light passenger loads?	
11.35	Do you have a clear policy on arrival time management and control (ETA Management)?	
11.36	Do you have SOPs on holding procedures, tactical speed and altitude management, information on clean holding configuration and speeds, lengthening of holding pattern to minimize turns, shortening of alternate for additional holding time, etc? <i>(Linear holding is good if one does not lose an arrival sequence or slot).</i>	
11.37	Do you have effective flight watch policy, flight progress monitoring and flight profile re-optimization for longer flights?	



11.38	Do you have a policy of advising Dispatch (Company) of any factor that can affect the present or future flights? <i>(Weather changes, deviations due to CBs, holdings, diversions, ground delays, un-forecast winds, unexpected turbulence, etc.)</i>	
11.39	Do you maximize the use of reclearance and re-dispatching techniques?	
11.40	Do you have a clear policy on the use of alternate fuel to land at destination if holding or contingency fuels are exceeded while holding? [NOT STATUTORY RESERVE FUEL]	
11.41	Do you have descent profile management guidelines including speed versus altitude trade-offs, FMS programming with descent winds and altitude crossing insertions guidelines?	
11.42	Do you have guidelines on arrival procedures and landing runway selection considerations?	
11.43	Are your SOPs specific enough on Approach planning? Do you have a policy on keep aircraft clean as long as possible? <i>(If no ATC speed restrictions exist, recommend the use of speeds that are most efficient as long as possible)</i>	
11.44	Is the use of use low-noise low-drag approach procedures (decelerated approach) standard for your airline? Are the SOPs specific enough with accurate target altitudes and speeds to maximize the benefits of the procedure?	
11.45	Is the use of reduced flap landings a standard with appropriate guidelines?	
11.46	Is the use of idle reverse on landing encouraged, and appropriate information available on fuel versus brake-wear trade-off? <i>(Carbon brakes wear is more a function of the number of applications rather than the amount of braking used. Noise and emissions are reduced and the passenger reaction is normally favourable. With auto brakes, the stopping distance is basically the same with or without reverse.)</i>	
11.47	Do you use engine out taxi-in as a standard procedure with appropriate SOPs?	
11.48	Do you start the APU on arrival? Is there a policy of shutting down the APU as soon as the ground power is available?	



11.49	Do you have an APU management policy on short or long turn-around? Do you have a policy of de-powering the aircraft when unattended?	
12	COLLABORATION WITH LOCAL ATS AUTHORITIES	
12.1	Have you established a good working arrangement with your local air traffic authority, to cooperate in airspace, air route and terminal area design?	
12.2	Are your pilots aware of air traffic control procedures and standards, and the limitations or capabilities of the local ATC systems?	
12.3	Do you have a familiarisation program for air traffic controllers to understand the capabilities of your fleet?	
12.4	Does your local air traffic authority have a familiarisation program for your pilots?	
12.5	Do you have an established process to exchange operational concerns or complaints with your local air traffic authority?	



13	MAINTENANCE & ENGINEERING	Internal Comments/Internal Action
13.1	Does your maintenance Program have an Aerodynamic Deterioration Program?	
13.2	Are aircraft washed buffed and polished ensuring a clean smooth service?	
13.3	Are fuselage doors maintained on a program that ensures the best door to fuselage fit, including door seals that provide enhanced sealing?	
13.4	Are the flight controls generally inspected to ensure that they do provide maximized performance eliminating drag?	
13.5	More specifically, are Spoiler panels rigged to the optimized condition eliminating Spoiler float?	
13.6	Are wing Leading Edge devices, rigged and maintained to maximize performance, eliminating vibrations and drag?	



13.7	Do engine and APU cowls/doors fit correctly eliminating induced drag?	
13.8	Do you ensure a maximized “fit” & “fair” configuration for Wheel Well doors to fuselage?	
13.9	Do you ensure maximized “fit” & “fair” configuration for wing to fuselage speed fairings eliminating drag?	
13.10	Do you ensure maximized “fit” & “fair” configuration for Stabilizer to empennage fairings?	
13.11	Are regular inspections carried out to ensure that windscreen to fuselage and skin joints are aerodynamically clean and do not induce drag?	
13.12	Do you utilize an aircraft dents and scratches map, so as to plan maintenance eliminating these sources of drag?	
13.13	Do you manage a program that minimizes/eliminates CDL dispatch of aircraft with items removed from an aircraft that can increase fuel burn through increased drag?	



13.14	Are Airspeed and Altimeter calibration readings verified at frequent intervals so as to eliminate errors causing an impact on fuel burn?	
13.15	Are engine inspections conducted to recognize gas path erosion and increased fuel consumption?	
13.16	Do you perform Engine and APU compressor washes improving cold stream efficiency?	
13.17	Are engines exposed adequately to out of trim maintenance actions enhancing fuel performance?	
13.18	Have your maintenance ground run specialists been trained adequately and retested at appropriate intervals to ensure ground engine operations that do not cause induced engine fatigue issues.	
13.19	Does your operation maximize the use of ground support equipment eliminating the use of engine and APU use for systems maintenance and overnight considerations?	



13.20	Does your company investigate the economy of alternative fuels, such as Bio – Diesel, to power its ground equipment?	
13.21	Do you conduct regular reviews of Manufacturers Service Bulletins that affect fuel consumption?	
13.21	Have you reviewed the ICAO publication entitled, Operational Opportunities to Minimize Fuel Use and Reduce Emissions? (Cir 303 – AN/176).	