

Where fluctuations in fuel price are a key driver of airline profits, the absence of a robust fuel efficiency programme seems strange. A health check of all facets of an efficiency project is a business necessity. Sander de Moor, Director, Operational Efficiency of Aircraft Commerce Consulting, takes an in-depth look.

# Fuel Efficiency health checks – their content, application and benefits

**F**uel efficiency (FE) is a universal goal in air transport. Over the past four decades, both macro-economic forces (oil prices, markets) and industry developments (changing landscapes, low-cost carriers (LCCs), regulations) have pushed the aviation industry to be more fuel-efficient. As a result, aerospace and original equipment manufacturers (OEMs) are producing more efficient aircraft, and air traffic management (ATM) organisations are providing more optimised flight routes and procedures, while airlines are implementing new initiatives to operate efficient aircraft as efficiently as possible, lowering operational costs and producing lower emissions.

The industry responded in various ways to the rise in fuel prices which started around 2005, and to the persistent drive to reduce emissions.

OEMs and organisations were asked by their customers or members to produce support and advice. Airbus Flight Operations Support & Line Assistance, for example, produced their well-regarded 'Getting To Grips with Fuel Economy' material, from a purely Flight Operations point of view only. Other OEMs produced fuel efficiency-related brochures.

The International Air Transport Association's (IATA's) SO&I division launched the fuel efficiency gap analysis (FEGA) / fuel efficiency consulting (FEC) programme, and built on work done by a range of FE experts in producing their all-encompassing 'Guidance Material and Best Practices for Fuel and Environmental

Management'. This is currently in its fifth iteration (copies are available to buy at <http://www.iata.org/publications/store/Pages/fuel-efficiency-guidelines.aspx>).

IATA became the largest and best-known force in FEC from 2005 onwards, but this has since largely petered out, due to a large drop in crude oil prices. This led to airlines losing interest in FE, as well as to changes in IATA's programme focus, set-up and management.

The concept of Cost Index (CI) in flight operations became a mainstream focus within the airline community. Those who had been exposed to CI before learned more about the theory and the proper application of this operational cost management tool. Others learned to live with it, or sometimes refused to adopt it, a situation which is seen even today.

Due to the increased focus on FE, and driven by more and more publicly voiced insights during conferences and in industry literature, traditional flight planning system (FPS) providers began to overhaul and update their products. Airlines were no longer prepared to accept reliance upon an outdated FPS, because they were now finding out just how much this was costing them in additional fuel burn.

In Europe the slow-moving saga of the Single European Sky (SES) received a push as environmental considerations finally took hold. On both sides of the Atlantic research programmes were put in motion towards modernising ATM, as well as improving the interaction between the three key stakeholders: the operators,

airports and air navigation service providers (ANSPs). This decade may yet see all the early promises of Free Flight, thereby supporting the more efficient use of airspace and increasingly efficient aircraft operations.

FE became the hottest selling point for new aircraft, and impressive strides were made with more efficient engines, together with lighter and more efficient aircraft and operational data systems that provide detailed information about their performance.

## Economic impact

Today, even at much lower fuel prices than in 2008-2014, fuel remains one of the largest budget items for airlines, accounting for 20-35% of their total budget, depending on their financial structure. Airlines with a good FE programme have reduced their overall fuel budget by 3-5%, in turn raising their bottom line by 1-2%.

Since fuel is a direct operational cost, FE directly affects the bottom line. With competition, efficient airlines need to have a definite competitive advantage. To compensate for each dollar wasted in fuel burn, airlines must generate a disproportionate amount of additional revenue to achieve the same profit result.

A significant issue with fuel is the lack of accountability. No single department 'owns' fuel. Flight operations is usually pointed at as the budget holder, but at the same time it is accepted that fuel is simply burned. For example, auxiliary power units (APUs) burn a lot of fuel, and many

departments do not really care about that. If an airport or station manager were held accountable for APU fuel burn, they would look more closely at the contracts for, and the use of, ground support equipment. The story of an APU shutting down on a maintenance apron after running out of fuel because it had been operating for days, with nobody in attendance is true.

## So what do we do?

Apart from creating more insight and transparency into how an airline uses its fuel, an FE programme focuses on the three key areas of activity in operating lighter, more efficient aircraft, more efficiently. In practice this means: less weight on board (including fuel); better maintained and more efficient aircraft; and more efficient flight operations in aircraft-handling, flight-planning, and working with external partners (ANSPs, regulators) to gain more efficiency.

To bring this about, airlines need to change the way that they run their business, not only in the obvious area of flight operations, but in all departments that deal with fuel, such as: flight operations, ground operations, maintenance & engineering (M&E), financial & commercial areas, fleet

management, and network management.

These are all departments that do not routinely communicate with each other about issues such as fuel consumption. A company-wide FE project should therefore have executive support that allows the FE manager to work with these departments. This is to manage the initiative, measure and sustain improvements and leverage successes, all supported by a fuel management information system (FMIS).

To ensure that relevant changes in FE are made and take hold, the main areas of focus are: (re)definition of corporate efficiency objectives and key performance indicators (KPIs) with the full support of executive leadership; reviews/revisions of current operational and business processes and enabling technologies to achieve FE improvements; development of communication and awareness strategies; and organisational restructuring to define new roles and responsibilities, supported by training programmes at all staff levels, across all functional areas to address specific FE (sub-)projects.

Many airlines face challenges in setting up an FE programme, due to their own organisational structure. Key to success is identifying and understanding these challenges, and agreeing viable

solutions. This takes considerable effort from the senior leadership.

## 2013 Fuel Efficiency Survey

In 2013, AircraftIT Magazine, together with then-ETS Aviation (now part of Boeing), invited airlines and operators to take part in an industry survey on FE.

150 airlines and operators participated, and the survey showed some shocking surprises. It had been expected that all operators would have at least some form of FE programme in place, since fuel had been such a large part (up to 40% in 2013) of operational costs for so many years. In fact, more than 50% of operators reported that running an FE programme was either a new idea, or had only been started in the last three years.

When asked what the major barriers to implementing an FE programme were thought to be, the leading reason was not cost, as might have been expected, but issues related to 'gathering and processing data'. This was actually not so much of a surprise, because flight operational data is actually not easy to manage, and was even less so in 2013.

More surprising was that the second-most mentioned barrier to implementing a FE programme was 'lack of priority by

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*A key aspect of any fuel efficiency programme is to ensure that no more fuel is loaded than is necessary to assure the safe operation of any given flight.*

senior management'. This actually contradicted a statement elsewhere in the survey which said that FE ranked second only to safety on the company priority list.

Possibly the company priority list was viewed differently on the ground and by senior management, or senior management needed a better understanding of the available FE data to convince them of its potential to unlock significant cost savings. In any case, of the 65% of the companies which said that they had access to data sources that would allow them to implement a dedicated FE management tool, 40% were taking management decisions based on what they described as 'unreliable' data. This might have been due to 49% relying on in-house software or Excel-based systems.

Obviously, a large gap existed between potential and actual efficiency, due largely to how companies are run.

With full results of this survey at <https://www.aircraftfit.com/Operations/FuelSurveyResult.aspx>, the key findings

were:

- More than 50% of operators spent over 30% of their costs on fuel, and almost 30% spent more than 40% on fuel.
- FE is second only to safety for 98% of respondents.
- While most operators now run some kind of FE programme, almost half are disappointed with the results.
- The top four FE initiatives are all ground-based.
- Half of existing FE programmes are run in-house without outside specialists and/or dedicated software.
- The biggest barrier to implementing an effective FE programme was the issue of extracting and processing reliable data. Surprisingly, not being a priority for senior management came in second place.
- Functionality was regarded as being twice as important as cost in evaluating an FE software tool.
- Accuracy of results was regarded as being twice as important as return on investment (RoI) in a programme's deliverables.

● In half the operational areas where fuel efficiencies are sought, operators were taking business decisions based on poor or low data reliability.

All of this begs a number of questions. Where do we stand today four and a half years later with airlines and their FE programmes? What would a 2018 FE survey tell us? Would the 2013 FE survey have helped in some way to bring more focus to FE programme management? Would the continued press related to developments in aircraft and operational data processing have helped change airlines' attitude towards data management, accuracy and availability?

By way of background, after the survey in 2013, jet fuel prices hovered around \$3 per US Gallon (USG) until 2014, with a sudden drop to about \$1.60 per USG by Q4 2014, and a further gradual descent to about \$0.90 per USG by Q1 2016. By now, one could be forgiven for thinking that devoting more time and resources to FE would be a waste, since the payback was just not there anymore. Or was it?

The very low fuel prices of 2016 are already history. Today we are looking at about \$1.90 per USG of jet fuel and the general feeling is that the future will see higher, rather than lower, prices. Those airlines that have maintained their efficiency drives have an operational cost advantage over those that have not, because they are prepared for the impact of any rise in the fuel price, to the point that a continuous FE drive is part of the airline character and is practised in all areas. In stark contrast, other airlines mention FE in the annual report, if that, and nowhere else.

## That Word- 'Change'

Regarding those airlines that have not or not fully embraced FE and emissions reductions as a key company initiative, one can point to a raft of reasons for this, including: internal ones (organisation, leadership, focus, accountability, silos, data, and resources); and external ones (regulator hindrance, state support, and lack of competition). These result in a company culture that does not adequately support a fuel or operational efficiency programme, or any other programme that relies on organisational and company cultural change.

The IATA 'Guidance Material and



Best Practices for Fuel and Environmental Management' (aka 'the Fuel Book') contains an informative chapter on dealing with organisational change and managing such change. Key requirements for a successful programme of change in a siloed environment are: executive commitment (leadership); an assigned champion of the cause; company-wide, cross-functional initiatives; using proven methods and tools; communicating success as much as possible; using proper and agreed metrics to measure improvements; and making the changes permanent and sustainable. There is a lot more to this of course, but the basis requires a willingness to make a change, in an organisation ready to adapt some of its processes, procedures, organisation and systems architecture and operations in the face of required cost reductions.

These are not easy tasks, and airlines often face difficulties in managing such projects, mostly since they usually have hardly any people with the right skillset to drive a change programme successfully across the silos. An airline is a very difficult organisation to manage, because of the make-up and background of its staff. People work in well-defined silos, often without proper managerial training or support, with M&E and flight operations each doing their own thing, and 'The Ground' including everybody else that is neither flying nor tinkering. The factions are protective of their turf, have their own subcultures and generally do not trust or work well with the other

parts of the organisation. This can lead to animosity if executive management has not succeeded in bringing staff together under a unifying vision that can be shared and supported by all.

### Fuel Efficiency Project

Simply put, no airline can afford not to have a fuel and operational efficiency programme in place.

Apart from lower operational costs and emissions, benefits include an arguably safer operation, because these airlines pay more attention to planning. This means a more accurate flight planning system, more precisely executed flights, and increased situational awareness. All are driven by proper analytical tools and statistics, better topical training for pilots and other operational personnel and a feedback mechanism to inform employees of airline policy, efficiency targets and performance data within specified timelines. And a safer operation is everybody's number one priority.

When an airline starts developing an in-house capability to initialise, set up and manage a full-on FE programme, it manages this by itself through using its own staff and/or hiring additional expertise, or engaging the services of a consulting firm specialised in this work.

Based on years of experience in visiting airlines, it is often the case that senior management has put FE on the agenda, but factions within that senior

*Fuel efficiency programmes focus on all aspect of an airline's flight planning process. This includes routeings, all elements of weight, cruise speed, and flight profile.*

management may not feel a need to engage with a full-blown programme. There are a large number of possible reasons for this behaviour, ranging from personal feelings and (lack of) knowledge or understanding, to political motivations and hiding the truth about issues in the airline. The result is often that some form of focus on efficiency is announced, and that limited initiatives are given a trial or, in the worst case, 'have been evaluated and not deemed applicable to the operation' for another spread of reasons, including 'safety', 'regulatory' or simply personal dislike.

For all these reasons, bringing change to an airline organisation is difficult and is likely to fail if many conditions for a successful implementation are not present.

This is where a consulting firm can be engaged to provide an impartial an outside influence in dealing with barriers to success. Consultants do not have a political stake in the organisation, they are experts at what they do and bring authority and insight and, importantly, are only a temporary additional presence in the organisation. As such, they do not present a political or labour factor. Their wealth of industry knowledge and information gained from working with other airlines facilitates comparative analysis (benchmarking), knowing exactly where to look and which questions to ask, and in sharing this insight help bring about a willingness to support the change.

Aircraft Commerce Consulting (ACC) is such a provider of FE consulting services. There are more players in the market, ranging from IATA and the large consulting houses to companies offering these services as an add-on. Each provider has a different approach and a different goal, using different tools, experts and expertise.

### ACC Fuel Efficiency Products

Following the industry lead of IATA, ACC's products comprise two distinct offerings: a Fuel Efficiency Analysis visit to verify the current state of FE and determine a baseline from which to improve; and a resulting series of Fuel Efficiency Improvement Project visits, the number and content of which is normally based on requirements (observed



findings, realistic goals and an agreed action plan) as well as desired deliverables. The link between the two phases is an Analysis Visit Report, which forms the basis for a negotiated Plan of Action towards the Fuel Efficiency Improvement Project.

### Fuel Efficiency Analysis Visit

The objective of the Fuel Efficiency Analysis visit is a detailed look into the current FE management processes and procedures, and has three sub-phases:

- Off-site visit preparation, including initial data collection and briefings, assessment documentation preparation, travel arrangements, followed by
- An on-site visit where the focus will be on project presentation, team definition, interviews with key stakeholders and operational staff in flight operations, flight planning/dispatch, M&E, as well as with external stakeholders like the air traffic control (ATC) unit and (hub) airport key staff.

This is followed by off-site work, further analysing collected data, mapping document findings, formulating improvement measures, establishing a realistic savings potential, and finally producing the main deliverable of this phase, the Analysis Visit Report.

This a comprehensive report on the current state of efficiency of the airline, presents complete insights in potential cost-saving measures and estimated savings versus implementation costs, including first quick-hit suggestions but

also observed barriers to success and possible ways to amend relevant areas of the organisation.

This phase of a Fuel Efficiency Project can be seen as a stand-alone project. Any next steps can be considered and taken within the airline organisation, and do not necessarily need to involve outside consultants. Based on ACC's experience, however, engagement of outside consultants is recommended for the improvement phase, to provide SME experience, facilitate knowledge transfer, navigate internal political and cultural factors, and offer delivery accountability.

### ACC Project Visits

The objective of the Fuel Efficiency Improvement visits is to support the FE team with their management of the intended transformation. This starts with establishing a Project Plan to initiate or revamp the actual FEM Programme (including, in parallel, the installation or use/assessment of the Fuel Management Information System), selecting champions and coaching the team-building process, setting up a steering committee or similar structure to govern the Project, helping to appoint a Fuel Efficiency Manager, creating scoring and tracking templates for all agreed initiatives, pushing quick-win implementations and working with the teams (coaching, training) until the Programme is self-sufficient, at which time the Project is handed over to the airline management.

The number of required visits and

*A FE programme must embrace all airline staff involved in flight operations, including flightcrew. A change in airline staff mindset is often required if the benefits of a FE programme are to be sustained in the long-term.*

project timeline, as well as the balance between on-site visits and off-site monitoring and coaching, will be tailored and adjusted to meet evolving airline requirements.

ACC strongly promotes knowledge transfer to airlines' staff. The aim is to promote development of awareness, skills and a self-sustaining capability to identify, qualify, implement and manage amendments to current and future operating processes, procedures and policies, as necessary for the realisation of fuel-related cost savings.

### Summary

While FE may be well known as a concept in the aviation industry, it is actively practised by only a relatively small number of airlines.

A lot of work is still to be done to make the entire industry more efficient, or as efficient as the most efficient airlines in the world. What is needed is better facilitation of all aspects of operating lighter, more efficient aircraft, more efficiently on the one hand, and a more refined way of measuring airline operational efficiency on the other hand.

It may therefore be useful to go beyond fuel burn, and include other factors that have an influence as well. Moving away from the over-simplified fuel burn per 100 passenger-kilometres measured over great-circle distances (several initiatives exist) or allowing reporting airlines to discard parts of their payloads 'in adjustments', to arrive at a more holistic approach to efficiency monitoring and reporting where all industry stakeholders (ANSPs, airports, and operators) are shown to have an effect. Another step might be to include negative-impact factors in their reporting, such as KPIs in airport and ANSP efficiency delivery as a way of compensating for a lower company efficiency result. This is part of an industry-wide efficiency-reporting metric that does not single out specific airlines, but takes into account the environment in which they have to operate. **AC**

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