2010 is the year that airlines affected by the EU's ETS have to collect fuel consumption and traffic data so that their free allowances for CO2 emissions can be calculated. Airlines will also be able to purchase further allowances from other industries once the industry comes into effect in 2012.

Complying with the EU's ETS

The European Union (EU) has been working to reduce many of the pollutants that are thought to cause global warming, including CO2 emissions. An emissions trading scheme (ETS) has been running for a number of years for ground-based polluters, such as factories and industrial units. Since 2009 airlines have been preparing to join the aviation ETS, which will be in operation from 2012. Trading for emissions certificates will take place from 2013, with full money trading between many different industries taking place in the ETS have gained experience in trading. These traded certificates will allow airlines to increase their CO2 emissions quotas.

Airlines that are based in an EU member state must, from 1st January 2010, monitor emissions produced on all their flights. Airlines that fly into the EU, but are based outside, are also affected. They must monitor the emissions of all their flights going in and out of EU airspace.

All affected airlines will collect data during 2010 for all the revenue tonne-kilometres (RTK) they generate, and the fuel they use covering all relevant flights undertaken during 2010. A final verified report is then produced ready to submit to the operator's administering member state. All reports, with both RTK and emissions data, must be submitted for auditing by 31st March 2011. From then the emissions data for each calendar year should be reported by 31st March of the following year. The number of RTKs an airline generates will only be taken into account for the first year that data is being collected, which in 2010.

The EU will allocate the aviation industry, as a whole, a cap on emissions in 2012 (the first trading period). This cap will be 97% of average 2004-2006 emissions levels. This will be reduced to 95% in 2013 (the second trading period).

Allowances for carbon emissions will be available to airlines as free certificates (depending on their initial emissions and RTK report) and auctioned certificates. Any additional emissions will need to be covered by the purchase of certificates. If an operator does well in reducing its CO2 emissions, it will be able to sell its surplus allowance or quota. Most airlines will have free allowances that are not equal to their full emissions. This is part of the ethos of ETS, to encourage less of fuel and to use more carbon reducing technology.

The 2010 data must therefore be in order for an operator to maximise its quota of free carbon allowance certificates and minimise the extra cost of buying more allowances in the future.

Exemptions

Although the ETS covers all flights in and out of Europe, there are some exceptions. According to Shaun Bainbridge, director at CICS, an ETS verification company, which audits RTK and emissions data, the three main reasons for exemption are: aircraft with a maximum take-off weight (MTOW) under 5.7 tonnes; a commercial operator with fewer than 240 flights in any one quarter for three consecutive quarters; and an operator producing less than 10,000 tonnes of CO2 per year. This last exemption, says Bainbridge, would be difficult to obtain until the operator was already in the scheme.

However, some carriers that are currently exempt from the ETS may know they will be increasing frequencies in time. Additional flights are likely to mean being included in the ETS. If they have not been monitoring their emissions and RTKs during 2010 they risk missing out on free carbon allowances when they do become eligible. There are therefore many more operators about to report their findings than currently need to.

Preparation

All operators that have, or want, to be part of the ETS must do a certain amount of preparation before they are even ready to collect data and report their findings.

In 2009 operators had to submit their methodology to their regulating agency to show how they would calculate their annual emissions (AE). An approved monitoring reporting plan (MRP), forming the basis for data collection, was then agreed between the agency and the airline. The MRP includes an equation for calculating the AE with regard to how much fuel has been burned, which Bainbridge says involves a number of factors like a fuel's specific gravity, net

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THE MAIN EU ETS EXEMPTIONS

- Aircraft with a maximum take-off weight less than 5.7 tonnes/5,700kg
- Fewer than 240 flights per quarter for 3 consecutive quarters
- Operator's total emissions are less than 10,000 tonnes per year
- Heads of state and Government ministers of Non-EU countries
- Military (except troop movement by charter aircraft), customs and police
- Commercial training flights (excluding positioning or ferry flights; no passengers must be carried)
- Medical, rescue, research or humanitarian flights
- Flights performed exclusively under visual flight rules as defined in Annex 2 to the Chicago Convention
- Overflights of Europe

The ETS scheme will allow airlines to purchase CO₂ emissions allowances from other industries. These will be needed by airlines if they want to expand their operations.

calorific factors (NCF) and on-board density. Guido Harling, chief executive officer and founder of ETS Verification GmbH, adds that the monitoring plan must be updated when changes, like fleet additions, occur.

Data collection

With an agreed MRP in place, data collection can begin. Since January 2010 all eligible operators have been collecting actual figures for fuel consumption and passengers and cargo. The data must be as accurate as possible. "I recommend keeping at least three decimal places to reduce any errors that can build up over a year," says Bainbridge. "It is also crucial that staff understand the ETS, and are not just data-entry clerks. At least two people should cover each role to avoid missing reporting deadlines due to sickness and holidays."

An organised airline will be recording all flight data, and either constantly entering it into a system or uploading it every couple of weeks or months. "The better the compliance, the faster the verification will be later," says Harling.

RTKs and the AE need to be included in the 2011 report, which is used to set a benchmark for subsequent years, when only the AE will need to be reported.

Revenue tonne-kilometres

RTKs are a measure of the revenue-paying traffic an operator carries. They are a multiplication of the fare-paying passengers, baggage, cargo and mail, quantified in tonnes, and the distance in kilometres they are flown.

An operator's RTKs for 2010 will be the basic traffic data for allocating free carbon allowances or emissions quotas. The higher the RTKs an airline records in 2010, the larger its free allowance in the future. It follows that airlines will want to increase their traffic volumes in 2010 to maximise potential allowances. An airline can only do so much, however, to achieve this, since flights and their passenger and cargo loads have to be verified. Also, additional flights just for this scheme cost money and will not necessarily increase traffic volumes. "Carriers should maximise available seat sales, even if it means selling at cost," advises Harling.
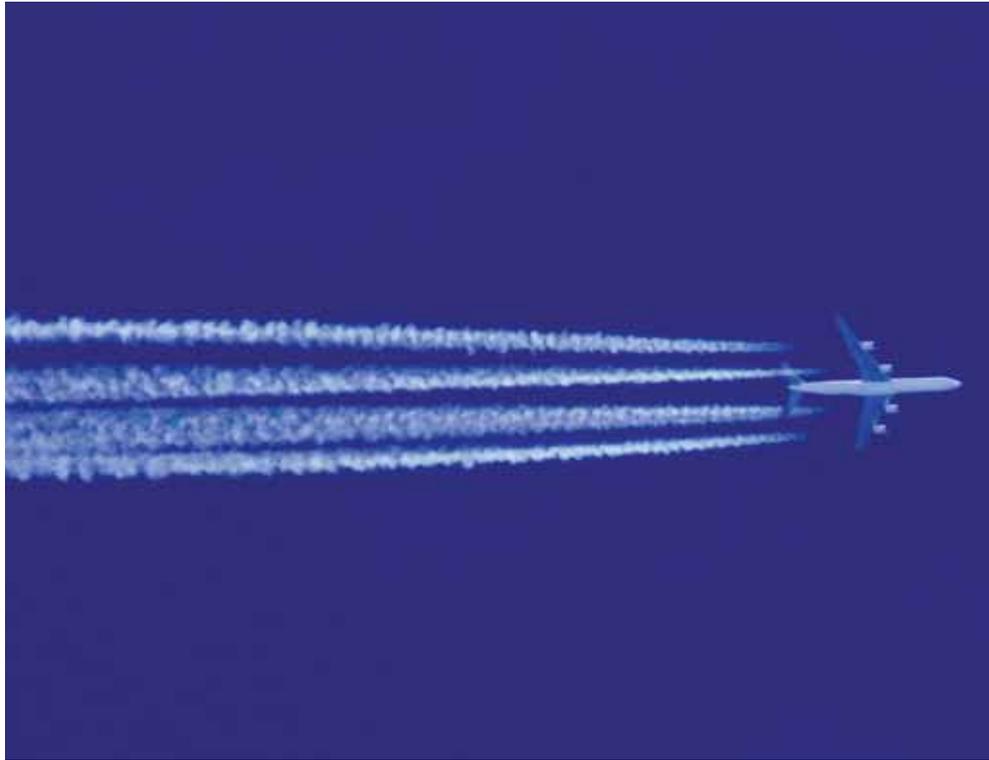
"It is also wise for airlines to instigate any new routes or frequency increases this year, so they can be accounted for in the allowances. Any traffic growth in subsequent years will eat into an operator's free allowances and means an airline will have to purchase additional certificates or applying for special growth exceptions. Special growth exceptions will be provided for realistic airline growth and new start-ups."

The RTK data comes from actual flight information including loadsheets, flight reports and boarding gate systems. This same data will then need to be available for verifiers to check.

Annual emissions

AE refer to the total amount of fuel used. In reality there are many factors involved in calculating the total fuel used and what emissions that equates to.

All the equipment on-board an aircraft relating to aviation fuel levels has to be calibrated, as does the machine (be it on the ground or from a truck) dispensing the fuel. All the fuel's data will be needed for an accurate measurement of the emissions to be made. So, the fuel's specific density, flight records and NCFs will be required, as will proof of how much fuel was uplifted. The on-board computers and fuel receipts will show actual usage per flight. "There are three levels of fuel data," says Bainbridge. "The top tier is fuel data from on board measurements, the second tier uses fuel supplier's data, and the third tier covers lesser quality records or if no suitable records were available. Flight operations departments will have to justify why they

have had to drop down tiers to provide data, since it needs to be as accurate as possible to ensure less error from the start."

Harling comments that "As fuel data has to be kept for 10 years now, this should not be an issue for most operators."

An average carrier will be using the same fuel type on most flights, so calculations should remain simple, but alternative fuels are offered at some airports. An example is Sasol's gas-to-liquid fuel at Johannesburg Airport. If an alternative fuel is used, then the fuel needs to be tested for its various factors.

"This will involve having fuel samples analysed and certified from a laboratory that is accredited to ISO17025," says Bainbridge.

Data collection IT

It is possible for an operator to enter all the relevant data into something as simple as an Excel spreadsheet, although the data would then need to be entered into an approved template. The larger the operator, the less suitable this is.

Many IT systems already collect an airline's passenger and revenue details, as well as the fuel used. Some systems have been adapted to assist those airlines that already use them to separately collect the ETS data for entry in the approved report template ready for verification.

There are some IT systems already in use for other reasons, such as eurocontrol and flight management systems (FMS) on aircraft, that have access to most, if not all, the required data, but may not be so easily accessible. Many of these systems

the click of a button all the data can be put into a report that could take administrators a week or more to do manually, or even semi-manually.
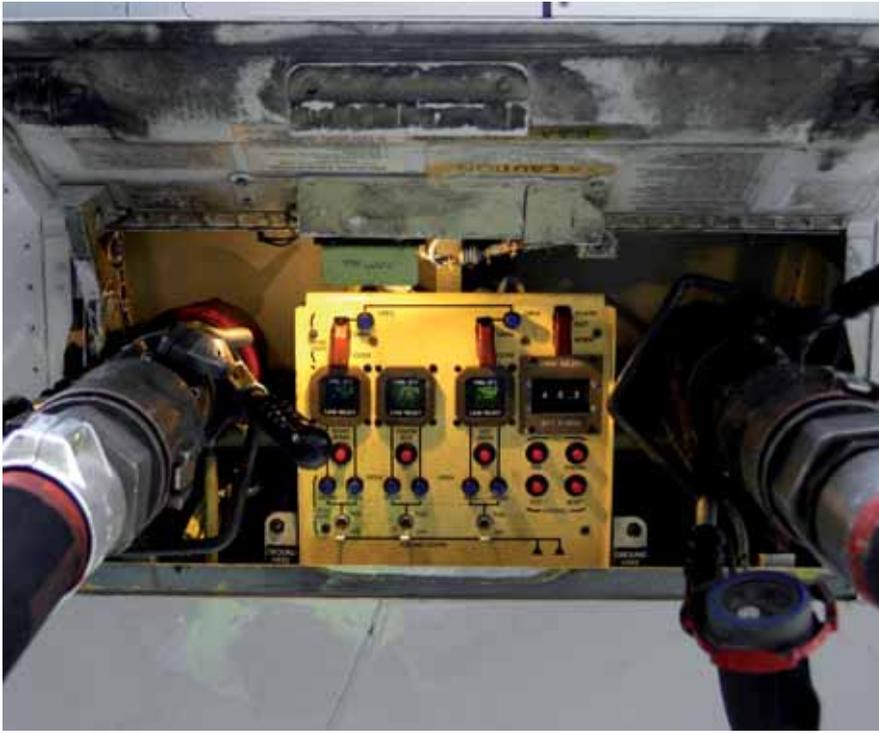
Verifying

Once an airline is collecting all its flight data for AEs and RTKs, it needs to start looking at the reporting process. All the data needs to be checked to ensure it is totally accurate before submitting a report at the end of March 2011.

To ensure the data is correct, and to complete verification of a report, a verifier will check the final calculations, the basic data and the paperwork and systems used, either by paying a site visit, or using the internet. Confirmed reasons must be provided for any missing data.

The company and people used to verify an operator's flight data must be officially approved. The EU member agencies of Germany, France and the United Kingdom are ensuring that all approved verifiers have passed both a written and oral exam before appearing on the official list. A number of companies already acting as verifiers for the ground ETS scheme, have said they wish to include aviation in their portfolio, while many aviation specialists are working towards approval. Airlines can therefore choose between verifiers that are aviation or ETS experts. Both will have their own advantages and, in only a short space of time, as many of the kinks of the system are ironed out, all those that are approved will become experts in both.

"For many operators," says Gerold Tumulka, ground operations director at Air Seychelles, "the lack of an approved list of verifiers is an issue. An operator can book a verifier now to be ahead of the game and have its report completed with time to spare. It is possible, however, that its verifier may not be included on the official list and the operator will have to start again at additional expense." This list is being compiled now as verifiers take and pass required exams, and qualify.

"A verifier needs to assess all the airline's methodology, by taking sample time periods, of say three months, and looking at them in depth," says Bainbridge. "If any errors are found the airline will be told and asked to correct

will have updates to resolve this over the coming year. Some systems have been designed specifically to serve an airline's ETS needs and these can be standalone or programmed to connect to operational systems already in place. The cost can be anywhere from Euros 10,000 to 100,000 per year, depending on how much data entry an airline decides to do itself, and the system's ability to produce an official report. Nevertheless, a good system can make savings in the long run. Carlisle explains that effective management of ETA data is a daily requirement to ensure that even a good system will automatically audit data. Any errors need to be found as soon as possible before the wrong data is carried on further into any calculations. An effective IT system like Aviation Footprinter will red flag any data anomalies, such as missing or mismatched data. The final time- and money-saving aspect of an effective system is the time spent by the verifier going through all the data. Ideally, the verifier is able to consult the data as quickly as possible without leaving their office, making the verifier's time cheaper for the airline, with no return visits. This frees the verifier up to visit more clients.

The main factor affecting an aircraft operator when choosing the right path for them is the cost. The full backup IT system will be incredibly costly to a small operator that only just reaches eligibility levels. They might find that a manually written spreadsheet serves them well, but they need to consider the additional costs, such as man-hours (MH), involved in pulling the relevant data and entering it in the approved template. This could mean hiring an additional administrator, or

reducing the number of active operational staff when data needs to be inputted.

One of the initially more costly data collection methods is a system that automatically talks to all the operational systems and collects what is needed. It then enters it into a database that is easy to search and will produce the data in the official format at the end of the reporting year. These systems require very few additional MH, and in some cases are linked to the internet. Verifiers then do not even need to make site visits, since all data, and scans of the supporting paperwork, are there at the push of a button. Harling adds that these systems could be useful as a tool to help fine tune and optimise a fleet's fuel use, and show the effect of different options, such as a fleet change, in the future.

"As well as the size and scope of the system, an operator needs to think about the level of readiness the system currently has, and when it is expected to be fully operational," warns Bainbridge. "As verifiers, we need an IT system to be transparent. We need to be able to get stuck into a spreadsheet and verify the integrity of the data, not just confirm that the figures in the boxes add up."

A system that is already in use by many EU and non-EU airlines is Aviation Footprinter. It can be a standalone system with the uploading of data via the internet, or it can be used to 'talk' to fuel and flight systems already in use by an airline. Verification can be completed by a site visit or through the internet at the verifier's own desk. Any additional documents can be scanned into the system, meaning no need for stacks of paperwork for verifiers to go through. At

them for the verifier, who will then audit the sample again but over a longer time frame. This could go on until the whole year's data has been checked. The verifier must remain impartial and therefore cannot consult directly with the airline but they can offer generic guidance on the error." David Carlisle, chief executive officer, ETS Aviation adds that just a 1% error in calculations could cost an airline as much as Euros 720,000 in lost carbon emissions certificates.

An error can have a huge effect on an airline's finances, not just due to the additional time taken by a verifier, but in the potential loss of free carbon allowance certificates. To minimise errors, regular data checks should be made. "A perfect approach," says Bainbridge, "would be a site visit from the verifier in September to verify the first nine months of data, and compliance issues such as IT systems, management systems and personnel. The final three months would be verified by a return visit or desktop verification. Split verification minimises risks because there is still plenty of time to make corrections if the first site visit reveals that the wrong data or collection method is being used. This spreads the workload for verification bodies."

Once the data is confirmed as correct the verifier will issue a certification. This is a declaration by the verifier on behalf of the operator that the information and data have been independently verified by an approved verification body. According to Bainbridge a verifier will only ever issue one declaration: 'verified' (without comment); 'verified with comment'; or 'not verified'. The latter is very unlikely to occur, because the company would be offered guidance to submit error-free data

before the declaration is made, as long as there is time. "'Verified with comment' means the data has been calculated with a deviation from EU methods but the verifier sees no issue," says Harling.

Reporting

Once an operator's data for the year has been audited and signed off, they need to submit a report in duplicate to the aviation authority.

Many eligible airlines have yet to start collating the required data and will be rushing to collect, verify and report their RTKs and AEs towards year-end. This is likely to result in auditors ending up with more requests and jobs than they have time for. This will be less of an issue if an operator has invested in a computer system that simplifies the process and minimises the likelihood of errors.

"In the first year of reporting, there is no way of knowing," says Tumulka "how strict the various agencies will be."

Simon Price, IT Associate, ETS Aviation also comments that there are many changes to the scheme still being made, with one major change already this year. Eurocontrol says that this is still not the final one.

Airlines will still have many questions even when the data is verified and a report has been submitted. Will the verifiers have been fully informed of all procedures, when many are still to be finalised? Will there be a difference between experienced verifiers from other industries or aviation experts going into verification? After the first year of reporting and before full certificate trading starts, there will be many issues and teething problems to be resolved.

Non-EU carriers

An operator based outside the EU is not necessarily exempt from the new legislation. Any aircraft flying into the EU can find itself being considered. Even if they are proven not to need to report their AEs, many airlines will start the process this year because their growth plans might mean that they would be eligible later - and joining later could mean missing out on valuable free carbon certificates. For example, Air Namibia has successfully asked to be excluded from the scheme, but it may ask to be included at a later date so that any future growth can be more easily implemented.

Tumulka says that Air Seychelles has to take the EU's ETS seriously, since 70% of its long-haul operations are Europe-bound. Air Seychelles is managing the ETS from its operations control centre, using existing infrastructure and a dedicated module for reporting. No extra staff or a separate department have been required to date. "In 2012, when the scheme is up and running, and other countries introduce their own forms of ETS, we may need an ETS manager," says Tumulka. "They would have to know the scheme inside out and be able to ensure maximum efficiency of data collection with minimal errors."

The Air Transport Association of America (ATA) has chosen to fight the EU over the fairness of the scheme, saying it contradicts the Chicago Convention that allows airlines to fly to other states. It adds that US airlines have already done many things to reduce emissions. The case is being referred by the British High Court to the European Court of Justice. The outcome is likely to have little effect on the ETS, because so many airlines have already started collecting data for it and it has been run in other industries for a number of years. With the likelihood of similar schemes in Australia, Singapore and Japan it becomes almost a global scheme. Harling says that the ATA case is likely to backfire because the Obama administration will probably introduce a similar scheme in the US. European airlines will therefore need to report their emissions to the US, just as American carriers report theirs to the EU.

Negative aspects

As well as US carriers, many other

ETS Aviation is one provider of software that collects fuel and payload data, and other key information. This data is used by verifiers to audit data so that airlines comply with the scheme.

global carriers are not keen on the expense of reporting emissions and having to apply for free allowances. They feel, as do many European carriers, that it will stifle aviation growth with many airlines simply going elsewhere if they have the option. Airlines that only fly into one EU destination, for example, may find it simple to move operations to Switzerland instead. If the flight is long the planners may instigate a 'fuel stop' just outside the EU in areas such as North Africa, Russia or Switzerland, before carrying on to the original destination. They would therefore have to report on a much shorter flight and have fewer emissions to trade in. However, since the airline would still have to go to the cost and effort of data collection, verification and reporting of AEs, they may as well fly direct and avoid incurring the extra landing, handling and time costs of a fuel stop. Tumulka thinks that additional stops are unlikely to be the answer, with the additional costs for ETS more likely to be added to the overall ticket price. He says that the further an airline is from Europe, the harder they will find it to comply with all the requirements and timescales. It is therefore wise for such operators to outsource their data collection, either entirely to a company that will collate and deal with verification, or to an IT system that will automatically talk to and select the relevant data from systems already running.

In April 2010, volcanic ash from Iceland halted or reduced many northern European flights, on and off, for a number of weeks. Many of the affected airlines have called for the RTK data collection to be postponed to next year, so that they can have a fair chance at reporting realistically high figures. The volcanic ash cloud in particular did not have such an impact on southern European airlines, whose RTKs will therefore be unaffected.

Free allowances

The most obvious way for an airline to reduce its emissions, and thus not use many of its certificates (or limit the amount it needs to buy anyway) is to upgrade its equipment. Modern engines and airframes are more fuel-efficient,

while using alternative fuels will also reduce an airline's carbon emissions. "Trading in certificates does not start until 2013," says Bainbridge. "Before that we will see a dummy run for getting systems in place and working out benchmarks and allowances". This will give airlines plenty of time to work out strategies for maximising their certificates and reducing their fuel use and therefore their emissions.

The ETS is not intended to stifle the European aviation market, so measures are required to assist new entrants and expansion, and avoid restrictions. One of these is the new entrant reserve (NER), a ring-fenced fund of allowances for both new airlines, and current airlines looking to expand. Each member state will have to retain a proportion of free allowances from their annual allocation for these two uses. Bainbridge says that an airline could apply to the NER for additional allowances for legitimate expansion. Their data would need to be verified and they would have to show that the new route, additional frequency or larger aircraft is realistically needed, and show how green they, and their fleet, actually are. Data from the expansion would be verified the following year to ensure it was a success. If it is not, the allowances will have to returned to the NER.

According to Harling, an airline can use or trade its certificates of emission reduction (CER) or emission reduction units (ERU). These are gained by supporting projects that take CO_2 out of the market, for example, wind power.

Future compliance

Once an aircraft operator has started the reporting process they will only need

to report AEs in future years. This will be until 2020 when free allowances are likely to be looked at again.

As the scheme matures, and the trading of certificates becomes more common, a volatile market is likely to arise. The emissions certificates can be seen as a similar commodity to fuel, so an operator cannot say what the certificate costs will be. According to Harling, the cost of covering each tonne of additional CO_2 could be Euros 13-26, but that is a small window because this market is an unknown quantity. While ground-based industries already trade in CO_2, aviation has no experience of it and there are very few methods available for airlines to reduce their emissions to such a level that they do not need to buy allowances. A low price could mean as little as Euros 5 per sector added to a short-haul flight and Euros 10 to a long-haul one. At worst this could rise to as much as Euros 40 per ticket per sector.

With other countries looking at starting their own emissions trading schemes, operators will find themselves reporting to more authorities than just the EU. As long as the reporting has similar requirements, there will not be too many issues. But if different criteria are asked for and each scheme has its own version of trading, things will start to get more complicated and costly, resulting in ticket prices going up or routes being cut.

Ideally, geographically-adjacent schemes will merge in time, until there are only one or two main ETSs, which treat all airlines fairly and allow the industry to grow where there is demand. **AC**

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