INTRODUCTION

In October 2016, the International Emissions Trading Association (IETA) and the International Air Transport Association (IATA) welcomed the International Civil Aviation Organisation’s Resolution establishing the Carbon Offsetting and Reduction System for International Aviation, known as CORSIA.

The new mechanism will achieve the international civil aviation sector’s global goal of carbon-neutral growth from 2020, by requiring operators to offset all carbon emissions over and above a baseline of their average emissions in 2019-2020.

While we note that ICAO is developing its system for the monitoring, reporting and verification of emissions, as well as the criteria to select which offset types will be eligible for use, IETA has also decided to do its part.

IETA and IATA, the leading business organisations in their respective sectors, have decided to collaborate closely to bridge the gap between the aviation world and the carbon market by establishing a series of workshops to be held around the world (Nairobi, Geneva, Miami and Singapore), at which experts and industry participants can discuss preparations for the world’s first sectoral carbon market mechanism. These workshops aim to gather the best expertise from both worlds.
The IETA-IATA workshops are a unique and unprecedented opportunity for the aviation sector and the carbon markets community to get together to explore the way forward and opportunities to collaborate, learning from each other’s experiences, with the goal of jointly developing approaches to achieving compliance.

We would also like to thank to our platinum and gold sponsors for helping make these workshops possible. A special thank you goes to: CBL Markets, Climate Smart Group, Shell Trading, American Carbon Registry, ACRE Investment Management, AitherCO2, Althelia Ecosphere/Ecosphere+, First Climate, and VCS.

**WORKSHOP SUMMARY**

This workshop series has three main goals:

1. Assist airlines in the preparation for the implementation of CORSIA,
2. Provide guidance on the practical implications of the scheme,
3. Provide insights in carbon markets.

These three goals are functional to the main objective of bridging the gap between the aviation sector and carbon markets.

Before the start of the workshop, participants were reminded of IATA’s and IETA’s competition and anti-trust guidelines.

**SECTION 1: CORSIA, MRV AND EUC**

**1. BACKGROUND ON AVIATION’S CLIMATE ACTION**

Michel Adam, IATA

The presentation ([here](#)) reminded participants that the aviation sector has a strong track record for climate action. Historically, efficiency improvements in the aviation sector outperform the wider economy: since 1990, aviation efficiency has improved at almost twice the rate of the wider economy. Taking a longer-term view, CO₂ emissions efficiency per seat improved by 80% since the 1950s.

In 2009, the aviation industry adopted a climate strategy. The sector’s strategy to tackle the climate challenge consists of 3 global goals and 4 pillars of climate action. The three industry goals are:

1. Pre-2020 ambition: 1.5% annual average fuel efficiency improvement from 2009 to
2020;

2. In line with the next UNFCCC commitment period, stabilize net aviation CO₂ emissions at 2020 levels with carbon neutral growth;

3. On the 2°C pathway: reduce aviation’s net CO₂ emissions to 50% of what they were in 2005, by 2050.

The 4 pillars of climate action that will make it possible to achieve these goals are:

1. Technology, including sustainable alternative fuels
2. Operations
3. Infrastructure
4. A global market-based measure: CORSIA

The first 3 pillars are intended to achieve emissions reductions in the aviation sector thereby bringing it closer to achieving the three goals. The fourth pillar – a market-based measure – is intended to act as a “gap-filler” to offset those emissions that cannot be abated through the other 3 pillars. It represents a measure to ensure that the aviation sector meets its commitment, and this is why it has been actively supported by the aviation industry.

Another reason why the aviation industry is very supportive of CORSIA is that, being an international system, it has the advantage of avoiding a patchwork of regional measures and different pricing systems.

This workshop series is meant to specifically focus on the second goal, and on the fourth pillar.

2. BRIEFING ON CORSIA

Michel Adam, IATA

Phased-implementation

The presentation is available here (second presentation in the slide deck). The Carbon Offsetting and Reduction Scheme for International Aviation, known as CORSIA, was established in October 2016 by ICAO Resolution 39-3, as a global offsetting mechanism with the goal to address increases in international civil aviation emissions post-2020. Its scope covers only international flights. Domestic flights are within the scope of the Paris Agreement and are regulated by each Party’s Nationally Determined Contribution (NDC).

Under the system, aircraft operators will be required to purchase carbon offsets, or “emission units”, to offset the growth in CO₂ emissions post-2020 covered by CORSIA. Carbon offsets are generated from a range of climate projects, often based in developing nations.
CORSIA will have a phased implementation: there will be a pilot phase, followed by a first phase. The phased implementation has been chosen to address the concerns of developing states and to take into account the concept of “special circumstances and respective capabilities” (SCRC), which is the ICAO equivalent of the concept of “common but differentiated responsibilities” (CBDR) under the UNFCCC process.

Under the phased implementation, in the pilot and first phases, from 2021 until 2026, CORSIA’s offsetting requirements will only apply to international flights between States that volunteer to participate in the pilot and/or first phase. This means that only flights between volunteering countries will be subject to offsetting requirements. Two airlines competing on the same route will be subject to the same obligation, irrespective of their country of origin – it’s a route-based approach.

In the second phase, from 2027, participation is mandatory for States meeting certain criteria, based on aviation activity and determined by revenue tonne-kilometre (RTK), which represents the level of traffic. One criterion is based on the individual share of RTK and the second on the cumulative share of total RTK. Least Developed Countries (LDCs), Small Island Developing States (SIDs) and Landlocked Developing Countries (LLDCs) are exempt, unless they volunteer to opt in.

In the second phase, CORSIA will apply to international flights between States that meet one of the following criteria:

- Individual share of international RTK in 2018 is more than 0.5% of total RTKs (except LDCs, SIDs, and LLDCs), or
- Cumulative share in the list of States from the highest to the lowest amount of RTKs reaches 90% of total RTKs (except LDCs, SIDs, and LLDCs), or
- States that do not meet the above criteria but volunteer to participate in the second phase.

As mentioned before, exempted states can decide to join, as long as they give sufficient notice to ICAO. The only requirement is to communicate to ICAO the intention to participate by 30 June of the preceding year. The same provision applies if states want to discontinue their participation, given that their participation is not mandatory.

**Determination of offsetting requirements**

The determination of offsetting requirements under CORSIA, which is the ‘size’ of each airline’s compliance obligation, is based on two different components:

- A sectoral component: based on the total CO₂ emissions of each operator, meaning that the sector’s growth is ‘shared’ between operators in proportion of their total CO₂ emissions.
emissions; and
● An individual component: based on the growth in CO₂ emissions of each operator, meaning that each operator offsets its own growth in emissions.

In order to calculate the offset requirements, each airline needs:
● Its sectoral component, which is based on the industry’s sectoral factor and the operator’s total CO₂ emissions,
● Its individual component, which is based on the airline’s growth in CO₂ emissions above its own baseline.

Calculations only take into account the CO₂ emitted on routes that are covered by CORSIA (“phased-in”), while emissions on exempted routes are excluded from all calculations. Airlines need to report their emissions to states, states need to report to ICAO and ICAO is tasked with carrying out the calculations to determine the sector’s ‘growth factor’, which will then be communicated to States and then to airlines.

CORSIA will start with a determination of the offsetting requirements based on a 100% sectoral component in the period from 2020 to 2029. Then the share of the individual component used in the determination of the offsetting requirement will increase over time. In the period from 2030 to 2032 the individual share will be used to determine at least 20% of the offsetting requirement and from 2033 more than 70% of the offset obligation will be based on the individual component.

Next steps

The next steps in the ICAO process for the implementation of CORSIA will be the development of SARPs (International Standards and Recommended Practices). ICAO is currently developing SARPs and the related guidance, in a process that is expected to last until 2018. When ready, SARPs will adopted by the ICAO council. ICAO will consult its Member States in the adoption process and states, after the SARPs are adopted, are expected to develop their national regulatory framework. All airlines will be required to start monitoring CO₂ emissions from 2019.

As a later step, the ICAO Council will undertake a periodic review of CORSIA, for consideration by the Assembly, every three years starting from 2022.
3. **Monitoring, Reporting and Verification of CO₂ Emissions (MRV)**

Robert Boyd, IATA

The presentation (available [here](#), third presentation in the slide deck) highlighted that ICAO’s GMBM – the global market-based measure to tackle the sector’s growth in emissions, which has taken the form of CORSIA – is based on three fundamental principles:

- Simplicity and flexibility;
- Transparency and confidentiality; and
- Data integrity.

These three principles need to be mirrored in the Monitoring, Reporting and Verification (MRV) requirements to be developed under CORSIA.

To reflect the principle of simplicity, and to reduce the administrative burden, some technical exemptions are in place to exclude:

- Aircraft operators emitting less than 10,000 metric tonnes of CO₂ from international aviation per year;
- Aircraft with less than 5,700 kg of MTOM (Maximum Take Off Mass)
- Humanitarian, medical and firefighting operations.
- Aircraft operators which commence an activity within the scope of CORSIA on or after its entry into force. Also called “new entrants”, these are exempted for three years, or until the year in which their annual emissions exceed 0.1% of total emissions in 2020.

All operators not excluded by these exemptions will need to develop an emissions monitoring plan and will be required to start monitoring CO₂ emissions, starting from 2019.

CORSIA’s MRV requirements have to be seen as an opportunity by airlines because, as well as being essential for compliance, the mechanism will help them understand their exposure and optimise their operations, reduce inefficiencies and maximise profits.

The first step to meet MRV requirements will be for operators to develop an emissions monitoring plan (EMP) for their international flights, which should include:

- Operator identification;
- Fleet and operations data;
- Methods and means of calculation;
- Data management and data flow.

EMPs will need to be approved by the operator’s national authority. In case an EMP is subject to a material change, the operator will need to seek re-approval from its national authority.
For monitoring purposes, a two-tiered system is being considered, whereby:

- Tier 1 would require the monitoring of actual fuel consumption; and
- Tier 2, applicable only to small operators below a certain emissions threshold, would be based on data estimations (data modelling).

Operators with emissions below the aforementioned threshold would be allowed to adopt the Tier 2 simplified procedure for all flights, while operators with emissions above the threshold would have to apply the Tier 1 methodology for non-exempt flights, while they would be free to choose between Tier 1 and Tier 2 for their exempt flights.

By the end of each year ICAO would inform countries of the previous year’s sectoral CO₂ emissions. States, in turn, will use ICAO’s information to calculate and inform airlines of their previous year’s obligation. At the end of the first compliance cycle, operators will be informed of their compliance obligation and will have to submit their emissions units for compliance in the following month(s).

The emissions units eligible for compliance will be defined as part of the aforementioned SARPs, and will need to respect the following Emissions Units Criteria (EUC) aimed at ensuring environmental integrity, whereby units need to be:

- Traceable;
- Additional;
- Verified;
- Permanent.

Some of the credit types currently considered for compliance are the UNFCCC’s Certified Emissions Reduction (CER), the VCS’s Verified Emissions Reduction (VER), and the Gold Standard’s credits. ICAO is also considering the potential use of allowances from mandatory markets for compliance under CORSIA.
SECTION 2: CARBON MARKETS

1. GENERAL INTRODUCTION TO CARBON MARKETS - WHAT IS A CARBON CREDIT?

Jochen Gassner, First Climate

This presentation (available here) provided an overview of carbon markets and flexible mechanisms, with an emphasis on baseline scenarios & credit mechanisms.

Jochen started by reviewing the development of carbon markets, from the Kyoto Protocol to the Paris Agreement and beyond. This included the use of flexible mechanisms - such as cap & trade and baseline & credit schemes - and how these mechanisms are used to link markets. Key market players for offset project development, financing and emissions trading were also introduced.

The session then took a more detailed look at baseline & credit mechanisms. Key concepts for baseline & credit mechanisms such as baselines, additionality and environmental integrity were introduced. The risk of double counting and provisions for the avoidance of double counting were addressed. An overview of the requirements, processes and procedures for the development of offset credits under both the Kyoto Protocol’s mechanisms and the voluntary carbon market was provided. A comparison of mechanisms and standards such as the CDM, JI, CAR, etc. were also discussed. The new project-based mechanism that is currently being developed under the provisions of Article 6.4 of the Paris Agreement was also presented.

Finally, a brief look at the current status of emissions trading schemes around the globe was presented, along with a high-level overview of carbon prices, emissions coverage and offset eligibility in emissions trading schemes. This was followed with a discussion of historical and forecasted supply of offset credits in both compliance and voluntary markets. The session ended with a look at anticipated demand from CORSIA’s requirement for climate neutral growth post 2020.

2. SUPPLY AND DEMAND SCENARIOS / CONSIDERATIONS FOR CORSIA

Rob Stevens, ClimateCare

This presentation (available here) looked at the factors that will affect future supply and demand in relation to CORSIA. First, using ICAO’s own analysis of offset demand generated by CORSIA, then looking at World Bank/UNFCCC projections of potential CDM issuance.

Rob’s presentation concluded with the key factors and decisions that will be critical in shaping the supply of credits for CORSIA – particularly highlighting the decision to be made by ICAO on eligible units but also how the Paris Agreement will treat project-based carbon credits and
whether there will be enough of an incentive for project developers to generate future credits from existing projects or to develop new ones

3. HOW TO ORGANISE THE COMPANY INTERNALLY?

Alastair Handley, Climate Smart Group

The presentation (available here) began by describing how in light of ICAO’s ambitious goal to cap airline emissions at 2020 levels, airlines need to look for cost-effective ways to reduce their output. As the world transitions to a low carbon economy, competitive advantage is figuring out early the best way to meet these new obligations. This means that reducing emissions is also about concrete goals mixed together with corporate goals and plans.

The presentation showed that carbon credits exist as a low-cost compliance option to help bridge the economic gap between today’s business environment and a low-carbon future. While improved technology and biofuels will solve the emissions problem in the future, today carbon credits are the most efficient and accessible way to manage the issue. Alastair highlighted that monitoring, reporting, and verification (MRV) is crucial for CORSIA compliance, but it is also about financial and environmental sustainability: there is no point in reducing emissions if a company goes out of business.

To use these emission reduction tools effectively every craftsman needs a plan. Alastair’s view is that the steps and strategies to achieving desired carbon emissions outcomes is achieved by instituting a Compliance Management Plan (CMP), collectively something called Climate Smart Aviation.

The purpose of a CMP is to clearly outline how a company will comply with emission reduction regulations, specifically answering What, Why, Who, When, How and How much? The plan is a 3- to 5-year personal, company roadmap. It’s amended annually or as needed to reflect operational changes and should be approved by upper management.

What a CMP can achieve:

1. Identify corporate stakeholders and the resources required to track and meet compliance obligations. Affected departments include finance, operations, information technology and regulatory affairs.
2. Document corporate KPI’s and set goals, roles and responsibilities. Who is ultimately responsible?
3. Document the process for quantifying and verifying annual emissions.
4. Document emission forecasts for 5 or more years.
5. Develop a cost-benefit analysis of available emission reduction options including biofuels, more fuel-efficient aircraft, better flight planning, load restrictions, supply chain emission reduction opportunities and carbon offset supply.

6. Document compliance risk and the preventative, detective and corrective controls that need to be implemented to mitigate risks.

7. Document strategy for acquiring offsets, such as “build or buy”, project type and project location.


Each airline has its own emission compliance requirements so there isn’t a single, boilerplate solution to apply across the industry. Every company requires a strategic emissions reduction plan tailored to their unique needs. These plans need to be institutionalised across the company, but must be integrated into the thinking of the company’s executive leadership team. In that leadership team, it is important to have a champion who can be involved and help other business units in the company (legal, financial, operations, IT, etc.) implement the plan. It’s also important to ensure organisational integration of the plan in order for the company’s plan on reducing emissions to be properly communicated to both internal and external stakeholders. Having regular dialogue with regulators, industry associations and customers on the plan can help ensure that it is a success.

4. HOW TO BUILD AN OFFSET PORTFOLIO?

Jessica Verhagen, Ecosphere+

Jessica’s presentation (available [here](#)) covered a number of considerations for building an offset portfolio as part of a company’s compliance strategy with CORSIA.

Starting with forecasting the volume of offsets needed, the company determines the extent to which it is buying for its own compliance. The company can then determine if a buffer is necessary to cover the difference in forecasted emissions versus reality and if the company is purchasing solely for its own compliance or more involved in trading.

The company would then consider the timing of buying and potentially selling offsets, weighing the pros and cons of acting prior to the start of compliance.

Another consideration is a preference for particular offset project types. While offsets are required for compliance, there are many benefits beyond carbon that different project types offer. Carbon offsets can also align with other areas of a company’s strategy, such as their marketing plan and staff engagement.
Finally, the company needs to define its risk profile: what instruments will they use to buy the carbon credits? The presentation provided an overview of different tools, such as Emission Reduction Purchase Agreements’ templates that are provided by IETA, purchasing at fixed or floating prices, bonds and other structured products and commodity bundling.

Using an example offset portfolio dashboard, the presentation described a case study tying together all the different considerations and reviews the next steps companies can take from here.

5. HOW TO MANAGE COMPLIANCE EFFECTIVELY

Alastair Handley, Climate Smart Group

The presentation is available here. Emissions systems (including offsetting schemes like CORSIA) are a product of legislation. There is no physical need for products or compliance outside of the regulatory framework that has been created. As such, compliance mechanisms are required to be robust in order to “police” emissions schemes.

The key obligation of an emissions scheme is usually to surrender allowances or offsets. This is the act that demonstrates that emissions have been effectively offset or reduced. However, there are usually a number of subsidiary compliance obligations that need to be adhered to. These can include the obligation to submit emissions monitoring and/or verification information. CORSIA provides for the development of such obligations but the detailed provisions remain to be agreed.

Aviation emissions pose particular difficulties in respect of compliance because of their international nature. Land-based installations are relatively easy to enforce obligations against. They cannot (usually!) move, so find it difficult to escape compliance enforcement actions. Enforcing compliance with legal obligations in respect of mobile equipment that can change legal jurisdiction within minutes or hours is more challenging. However, there are precedents for doing so in respect of matters such as recovering aviation navigation charging costs.

Most legal entities do not go about their business seeking to be subject to regulatory enforcement procedures. This would have significant reputational implications, as well as leading to penalties in the long run. Being out of compliance usually arises from lack of awareness of rules or from not implementing them properly. Having a good understanding of the rules and robust internal procedures is therefore very important.

A good understanding of compliance obligations can also create cost savings. It will help to implement an effective trading strategy, which can often reduce the cost of compliance with emissions schemes. First movers who have a good understanding of what their compliance obligations are can be at the front of the queue in respect of negotiating offset purchases.
Locking in long-term contracts for the supply of offsets can help to protect against long-term price rises.

Beyond this, emissions schemes are about environmental protection. As such, “gold plating” compliance can give rise to reputational and other advantages. For example, companies can get directly involved with underlying emissions reduction projects. This can be done for example by developing projects themselves, by taking an equity stake in them, or by providing some up-front development finance to projects. Further, it may be possible to implement emissions reductions which generate offsets within existing supply chains. An example of this would be the development of a renewable energy project at a company’s facility that allowed it to reduce emissions and give rise to offsets, which could then be used for compliance with an emissions offsetting regime.

6. WHAT ARE THE KEY TRADING STRATEGIES TO FOLLOW?

Eric Boonman, Statkraft

The presentation (available here) demonstrated the various options available to market participants for trading within the global carbon markets. Eric started by offering a brief overview of the historical background on aviation climate action and the relations with emissions trading, from 1997 until today, to contextualise the presentation.

The presentation then covered compliance options for airline operators under the EU ETS. These were presented together with a pricing graph of the various credits, to provide a reference and to offer some lessons learnt, while keeping in mind the substantial differences between the EU ETS and CORSIA. In particular, the differences between spot, forward and future contracts were discussed. The presentation also outlined the main routes available to compliance entities to access the marketplace and trade: through a broker, via a direct contact or on an exchange.

Finally, optimisation strategies for airlines were further discussed by offering some example of different options available to airlines for compliance with the CORSIA mechanism.

7. EXPERIENCES FROM THE CDM AND VOLUNTARY CARBON MARKETS

Mary Grady, American Carbon Registry, Chandler Van Voorhis, C2I, and David Antonioli, VCS

Mary began the presentation (available here) by offering an overview of the most common crediting programmes, such as the Clean Development Mechanism (CDM), the Voluntary Carbon Market (VCM) and the California Carbon Market (CA). The overview looked at the project types, demand, oversight, units and quality for the various programmes. The following slide then looked at the trends for credit issuance and retirement under the most commonly used
voluntary standards: VCS, Gold Standard, Climate Action Reserve (CAR), American Carbon Registry (CAR) and Plan Vivo. Mary argued that CORSIA could leverage the voluntary carbon market by seeking to approve GHG crediting programmes from existing options. This ‘open architecture’ approach could be similar to Framework for Various Approaches (FVA) and Article 6.2 of the Paris Agreement as well as to corporates choosing voluntary crediting programs they like.

To provide some insights on a real-world project, Chandler presented the GreenTrees Advanced Carbon Restored Ecosystem (ACRE). ACRE is a programmatic reforestation project in North America’s largest rainforest and primary bird migration corridor, the Mississippi Alluvial Valley. It comprises over 120,000 acres and 450+ participating landowners, it is verified to ACR Standard and co-benefits include enhanced wildlife habitat, increased water storage, improved water and soil quality, local economic development (recreation and tourism).

David presented some of the key differences and similarities between the CDM and the Voluntary Carbon Market (VCM). David also explained how CORSIA is very similar to the VCM in that it sets a minimum threshold for quality (through the use of EUCs) but would let various GHG crediting programs operate within the scheme (i.e., ‘open architecture’ approach). David therefore described some of the main programmatic features that robust GHG crediting programs should have, and how these are very similar to the CDM. David then discussed the benefits of the ‘open architecture’ approach and concluded by linking this all to key elements of the Paris Agreement, including how early action under the CORSIA could drive those elements of the Paris Agreement.

8. OVERVIEW OF REGISTRIES AND CARBON MARKET EXCHANGES

Rene Velasquez, CBL Markets

The presentation (available here) demonstrated that registries play an integral role within environmental markets. Registries are essentially secure databases used to track environmental credits throughout their life cycle. Importantly, registries provide the institutional, legal and operating infrastructure necessary to ensure efficient and transparent recording of emissions units, reportable emissions, and compliance actions in order to ensure accountability and environmental integrity of compliance systems such as CORSIA.

The presentation also provided details on all of the critical aspects of a well-designed registry (or system of registries) and how they should be integrated with one another as well as environmental exchanges. Registries can store, track, and help refine credits. They play an important part in the overall carbon marketplace as they provide security, transparency and integrity of the carbon market. It’s important to think of registries like a bank account: units are stored and are used by the owner of the account. Each unit has a unique serial number that can
also be tracked. Registries in different carbon markets (compliance, voluntary and the registry to be used for CORSIA) also need to communicate between each other in order to avoid any issues of double-counting. Eventually an interconnected registry system between compliance carbon markets, voluntary carbon markets, CORSIA and the UNFCCC will need to be established.

A well-designed exchange should provide an easy to use interface that allows users to source a wide range of emission reduction credits, with low fees, price transparency and anonymity. The presentation detailed how CBL Markets provides market participants with access to the world’s environmental commodity markets.
SECTION 3: UNFCCC’S UPDATE ON CARBON MARKETS, AIRLINES MRV AND SCENARIO SIMULATION

1. UNFCCC’S UPDATE ON CARBON MARKETS

Daniel Galvan Perez, UNFCCC Secretariat

The UNFCCC presented (presentation available here) aviation-specific updates on the status of the negotiations on UNFCCC mechanisms and addressed how CORSIA units are aligned under the Paris Agreement carbon markets.

The presentation further discussed the current pipeline of CDM projects and programmes across the globe and highlight benefits related to the use of Certified Emission Reduction units through voluntary cancellation by aviation sector players to meet their commitments under CORSIA.

In addition, the presentation focused on two aviation-specific methodologies developed by the CDM Executive Board with support from ICAO for developing projects and/or programmes related to the aviation sector. The presentation listed a number of mitigation projects that can be developed by airline companies and/or airport management companies or authorities, such as:

a. Use of solar power for at-gate operations;

b. Use of e-taxiing device for taxiing;

c. Use of renewable energy for airport operations;

d. Use of energy-efficient lighting and air-conditioning equipment and technologies for airport operations;

e. Fuel switch in vehicles used for internal aviation activities such as passenger and cargo movement.

The presentation also highlighted how the UNFCCC’s regional collaboration centres will provide support to aviation players in developing mitigation projects and/or using CERs for voluntary cancellation purposes to meet commitments under CORSIA. As part of this, the UNFCCC will be looking into ways of how the UNFCCC registry can communicate and cooperate with other registries where units eligible under CORSIA can be stored.
2. AIRLINES MRV

Robert Schlingman and Rohini Sengupta, United Airlines

The presentation (available [here](#)) covered United Airlines’ experiences with MRV. They first introduced the three basic concepts of:

- **Monitoring**: Basic methodologies to minimize an operator’s burden, while facilitating effective reporting of greenhouse gas emissions pursuant to regulatory requirements.
- **Reporting**: The mechanism by which greenhouse gas emissions are informed to the appropriate regulatory authority, via parameters set out in regulation.
- **Verification**: Third party verification of operators’ reports to ensure accuracy and transparency in the reporting process.

The presentation highlighted that United is subject to MRV requirements under the EU ETS, which has an extensive MRV process.

The presentation then provided details on different methodologies for the calculation of fuel consumption. Fuel consumption is used to determine CO₂ emissions, which are calculated by multiplying the fuel consumption by emission factors specified by reporting requirements. Fuel density, another crucial element in these calculations, is a data point collected from most stations, where available, via direct entry into the Aircraft Movement System. Data, from the various inputs, comes together via an IT process, allowing granularity and automation in reporting. Control activities were established to mitigate potential data issues in a risk analysis during implementation, as outlined in a table in the slides. Overall, the EU ETS verification process has become much more streamlined, as reporting years have gone on.

The presentation also outlined that, beside the EU ETS MRV requirements, United has rigorous MRV rules for fuels reporting, for the purpose of their internal and external fuels reporting. These differ from the EU ETS MRV process and are:

- IATA Fuel Reporting & Emissions Database (FRED) Reporting: Reporting of fuel consumption, RTK, ATK, biofuel consumption, and purchased carbon offsets;
- United Greenhouse Gas Footprint: Carbon footprint, developed internally, to broadly characterize United’s environmental impacts, extending beyond aircraft combustion to ground support equipment, natural gas combustion, and indirect emissions

Over the course of MRV implementation, specifically of the EU ETS program, United has learned many lessons that have led to more streamlined and efficient approaches to reporting, especially with regard to: identifying risks, determining uncertainties, establishing and utilizing redundancies.
3. **Carbon Markets Scenario Simulation**

Facilitated by Chris Perceval, the South Pole Group

This session consisted of:

i. Introductory presentation ([here](#)), identifying best practices in the airline sector and related industries,

ii. Break-out session: Group simulation assuming the roles of one of three possible (hypothetical) scenarios to come up with a recommended offset strategy,

iii. Presentation of the results of the different groups of the break-out session and general discussion

The purpose of this session was to share experiences and recommendations on how to establish a high impact and effective offsetting strategy. Following an introduction by the South Pole Group, including some examples of best practice, participants were divided into smaller groups in which they will considered and discussed some hypothetical situations and real world examples of carbon credits that they could choose from in determining their approach.

During the report back, there was a discussion about the advantages and disadvantages of different choices.

Some of the recurring reasons that motivated groups to opt for one offsetting strategy over the others were:

- The willingness to expand in a new market, where the offset project was located;
- The specific offset project offered a good marketing opportunity thanks to its characteristics;
- The offset project offered a good communication potential;
- The offset project offered a set of co-benefits that were in line with the requirements of the scenario description;
- The offset credits offered low prices and low risks at the same time;
- The geographical location of the offset project.
ANNEX I: AGENDA

IATA & IETA Workshop Agenda, Miami (14 - 15 March 2017)
Carbon Offset and Reduction Scheme for International Aviation (CORSIA)

14 March: 10.30 – 18.30

1. Welcome and Introduction

2. Background on Aviation’s Climate Action
   Michel Adam, IATA (15 minutes)

3. Introduction to CORSIA
   Michel Adam, IATA (1 hour)
   i. Phased-implementation
   ii. Determination of offsetting requirements

4. Monitoring, Reporting and Verification of CO₂ Emissions (MRV)
   Robert Boyd, IATA (1 hour)

   13:00: Networking Lunch (1 hour)

5. General Introduction to Carbon Markets
   a) What is a carbon credit?
      Jochen Gassner, First Climate (30 minutes)
      i. Types of credits
      ii. Credit standards
      iii. Who are the key actors in a carbon market?
      iv. Overview of carbon markets to date

   b) Supply and demand scenarios/considerations for CORSIA
      Rob Stevens, ClimateCare (15 minutes)

   Coffee Break (15 minutes)

   c) Carbon market compliance
      i. How to organize the company internally?
         Alastair Handley, Climate Smart Group (30 minutes)
      ii. How to build an offset portfolio?
         Jessica Verhagen, Ecosphere+ (30 minutes)
      iii. How to manage compliance effectively
         Alastair Handley, Climate Smart Group (30 minutes)
      iv. What are the key trading strategies to follow?
         Eric Boonman, Statkraft (30 minutes)

6. Experiences from the CDM and voluntary carbon markets
   Mary Grady, American Carbon Registry and David Antonioli, VCS (30 minutes)

7. Overview of registries and carbon market exchanges
   Rene Velasquez, CBL Markets (30 minutes)
15 March: 09.00 – 13:00

1. UNFCCC Update on Carbon Markets
   Daniel Galvan Perez, UNFCCC Secretariat (45 minutes)
2. Airline presentation: experiences with MRV
   Robert Schlingman and Rohini Sengupta, United Airlines (45 minutes)

   Coffee Break (15 minutes)

3. IETA Carbon Markets Scenario Simulation facilitated by Christian Dannecker and Chris Perceval, the South Pole Group
   This session consists of:
   i. Introductory presentation, identifying best practices in the airline sector and related industries
   ii. Break-out session: Group simulation assuming the roles of one of three possible (hypothetical) scenarios to come up with a recommended offset strategy
   iii. Presentation of the results of the different groups of the break-out session and general discussion
# ANNEX II: LIST OF PARTICIPANTS

## IETA Invitees

<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
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<tbody>
<tr>
<td>Arjun Patney</td>
<td>American Carbon Registry</td>
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<tr>
<td>Eric Ripley</td>
<td>American Carbon Registry</td>
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<td>Jessica Orrego</td>
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<td>Mary Grady</td>
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<td>Chandler Van Voorhis</td>
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<td>Helen Howes</td>
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<td>Rene Velasquez</td>
<td>CBL Markets</td>
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<tr>
<td>Alastair Handley</td>
<td>Climate Smart Group</td>
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<td>Ed Alfke</td>
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<td>Robert Stevens</td>
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<td>Dan Linsky</td>
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<td>Jeffrey Fort</td>
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<td>Atalia Howe</td>
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<td>Jessica Verhagen</td>
<td>Ecosphere+</td>
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<td>Jeff Cohen</td>
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<td>Jochen Gassner</td>
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<td>Katie Sullivan</td>
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<td>Stefano De Clara</td>
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<td>Mylene Trujillo</td>
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<td>Edward Rumsey</td>
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<td>Jessica Stavoile-Carter</td>
<td>Ruby Canyon Engineering, Inc.</td>
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<tr>
<td>Christine Bassitt</td>
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<td>Scott Hartman</td>
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<td>Christopher Perceval</td>
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<td>Gabe Plotkin</td>
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<td>Daniel Galvan Perez</td>
<td>UNFCCC</td>
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<td>David Antonioli</td>
<td>VCS</td>
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**IATA Invitees**

<table>
<thead>
<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Nancy Young</td>
<td>A4A (Airlines for America)</td>
</tr>
<tr>
<td>Hector Rios Ospina</td>
<td>Aero República (Copa Airlines Columbia)</td>
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<tr>
<td>Hector Reyes</td>
<td>Aeromexico</td>
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<td>Victor Carbajal</td>
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<td>Mena Salib</td>
<td>Air Canada</td>
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<tr>
<td>George Petsikas</td>
<td>Air Transat</td>
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<td>Carol Sim</td>
<td>Alaska Airlines</td>
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<tr>
<td>Daniel Chereau</td>
<td>ALTA (Latin American &amp; Caribbean Air Transport Association)</td>
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<tr>
<td>Gonzalo Yelpo</td>
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<td>Tom Opberbeck</td>
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<td>Les Aalders</td>
<td>Air Transport Association of Canada</td>
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<td>John Aliberti</td>
<td>Atlas Air</td>
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<td>Avianca</td>
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<td>Bibiana Berbeo</td>
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<td>Juan Galvis</td>
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<td>Natalia Daza</td>
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<td>Oscar Moscoso</td>
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<td>Susana Mantilla</td>
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<td>Mario Rodriguez</td>
<td>Avianca El Salvador</td>
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<td>Raquel Keiroglo</td>
<td>Azul Brazilian Airlines</td>
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<td>Stephanie Zhu</td>
<td>Delta Air Lines</td>
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<td>SriLankan</td>
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<td>Jim Miller</td>
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<td>Cam Bertsch</td>
<td>WestJet</td>
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<td>Geoffrey Tauvette</td>
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CBL Markets

CBL Markets provides market participants with access to the world's environmental commodity markets. With a vision of bringing efficiency, transparency and liquidity to environmental markets, our new multi-product exchange connects buyers and sellers around the world to facilitate the secure and seamless trading of products in environmental commodity markets, including Compliance Carbon, Voluntary Carbon, Renewable Energy and the Australian Water Market.

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Climate Smart Group

We believe in environmental sustainability and stewardship. We believe in corporate growth and profit. The Climate Smart Group offers solutions that do both. Led by your company's specific needs, The Climate Smart Group is a one-stop, carbon project development and consulting service. Here to support and guide you through the maze of carbon reduction regulation, verification, compliance, registration and credit creation. We're a global network of environmental experts with deep knowledge that spans both multiple geographies and market sectors. Our mission is to support clients in meeting incoming emissions reduction requirements while at the same time helping them build growth, enhance public good will and generate revenue. Where some see only a burden in the new guidelines, we help you see — and seize — the opportunity. We can find solutions together. Let us know how we can serve you.

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Shell Trading International Limited

Shell provides a wide product and service portfolio to deliver the best energy solutions for airlines.

Every day Shell Aviation provides fuel at over 900 airports in more than 36 countries globally for around 2 million aircraft. Shell Aviation is a world leader in marketing aviation fuel and operating airport fuelling facilities and has a huge range of knowledge on everything from formulating better fuels to designing and managing cost-effective installations.

Shell Trading and Supply is one of the largest energy trading businesses in the world. We can support customers by offering risk management services across the range of exposures airline companies face, from fuel price to CO2 compliance.

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» AMERICAN CARBON REGISTRY (ACR)

ACR, a nonprofit enterprise of Winrock International, is a leading carbon offset program recognized for environmental integrity and innovation. Founded in 1996 as the first offset program in the U.S., ACR has experience in the development of science-based GHG emissions reduction standards as well as experience in the technical aspects of carbon offset project registration, oversight of third-party verification, issuance of serialized offset credits and registry operations. ACR is also active in regulated carbon markets serving as the leading Offset Project Registry for California’s Cap-and-Trade Program and approved to issue ACR offset credits for compliance under Washington’s Clean Air Rule.

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» ACRE INVESTMENT MANAGEMENT

ACRE Investment Management (AIM) is the parent company to four operating entities working in concert to drive conservation through reforestation and restoration on a scale that will stem climate change, restore biodiversity, clean and preserve water resources, and empower individual consumers to drive restoration within their daily business transactions. AIM’s four entities are Big River Cottonwood Nursery, Forest Green, GreenTrees, and Conservation+. AIM is the ideal partner for businesses desiring a reduced carbon footprint, a new channel for engaging consumers, or an opportunity to demonstrate a strong commitment to environmental stewardship. Learn more at www.acre-investment.com.

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→ AITHERCO2

We are at the forefront on climate change issues and the EU-ETS developments. Since 2010, we provide independent professional advisory on environmental policies and offer strategic solutions for trading and hedging needs while helping companies managing their exposure to the world’s carbon markets. With offices on all continents, we are at the forefront in global environmental commodities, optimizing CO2 portfolios and reducing the impact of our Clients in the skies. Sustaining our planet is the commitment we take and a promise we want to maintain.

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→ ALTHELIA ECOSPHERE / ECOSPHERE+

Ecosphere+ is a new venture founded by the Althelia Climate Fund created to build markets that put a value on carbon and incentivise sustainable business models. It is our mission to scale up financing to protect our most valuable climate assets; forest landscapes. Alongside a transition to a low-carbon energy system, we simply cannot achieve a safe climate without significant efforts to halt and reverse land-based emissions. Doing this will not only deliver much needed emissions reductions but also major environmental and societal benefits too. The critical tool is a price on carbon coupled with responsible supply-chains.

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→ FIRST CLIMATE

First Climate – Dedicated, Naturally.

Founded in 1999, First Climate initially served as a developer of global carbon reduction projects. While broadening its portfolio of products and services, the company has evolved to become one of the leading service providers in the field of sustainability solutions for companies and organizations. First Climate’s core competencies cover products and services relating to carbon neutrality, green energy, water management, green investments, and project development. For public sector clients, First Climate provides consulting in industry best-practice as well as emissions trading services.

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