impact

ON SUSTAINABLE AVIATION

January 2024

Year in review 2023

impact
ON SUSTAINABLE AVIATION

Content

Foreword

Dr. Ulrike Ziegler

Dr. Ulrike Ziegler, Chairwoman of the Board of impact on sustainable aviation e.V.

Another year over... a new one just begun.

While I sit here collecting my thoughts, I cannot help but reflect on today's statement by the UN that 2023 is set to be the warmest year on record, greenhouse gas levels continue to increase and that Antarctic Sea ice levels have reached a record low. At the same time, the Potsdam Institute for Climate Impact Research ("PIK") has published its Global Tipping Points Report[1] which has involved more than 200 scientists from all over the world.

If you are hoping for good news – sorry. "**5 tipping systems currently at risk, 3 more at risk with global warming breaching 1.5°C. ...** Crossing these thresholds may trigger fundamental and sometimes abrupt changes that could irreversibly determine the fate of essential parts of our Earth system for the coming hundreds or thousands of years."

But let's not feel like it's completely hopeless. We can still take some comfort from the power of innovation and determination. Most people that impact has engaged with in 2023 share such determination. Never in the history of aviation has decarbonization received as much attention as it does now. We, at impact, have experienced this first-hand welcoming seven new members bringing our membership base to 40. That's 40 institutions who are accepting the challenge, are dedicated to driving change, and are shaping the new normal rather than waiting to be overcome by a future out of their control.

The dedication of our members has led to tangible output. We published the "Milestone Concept" White Paper, designed a standardized ESG questionnaire which will ease the reporting burden for our clients, and we also produced guidance papers on the applicability of our Milestone Concept[2] to loan agreements. As I write this, we are engaging with airlines and lessors to obtain their feedback.

[1] https://global-tipping-points.org/update/download/4608/
[2] https://impact-on-sustainable-aviation.org/shared-files/1023/?Impact-White-Paper_Milestone-Concept_February23-2.pdf

In early 2023, impact's Board of Directors agreed to extend our efforts beyond technicalities. Following multiple meetings on SAF the overall feeling that stuck with us was that the funding challenge did not take center-stage even though funding is key for SAF projects and other technologies.
We clearly saw the need for implementing the impact Enabler Workstream which aims to foster know-how building around SAF projects and mobilize funding.

The gap between taking SAF from being a concept to producing it at scale is huge. Multiple stakeholders must cooperate and collaborate: inter alia technology, project developers, feedstock providers, energy suppliers, off-takers, infrastructure providers, airports, lawmakers, regulators, certification agencies and last but certainly not least financiers (equity, venture capital, project finance).
It's a giant jigsaw puzzle, where each player only has some of the pieces.

A proper understanding of the complexities alongside well-designed risk mitigants utilizing a balanced risk sharing approach is of the essence to mobilize funding. That is why the establishment of impact's Science Workstream, featuring well-renowned scientists, has been so important. The team has invested substantial time in assessing various decarbonization trajectories and evaluating the scientific basis for our Milestone Concept. It was crucial to have a model which was free from assumption-heavy parameters, does not discriminate against any given business model, rewards progress on, "the faster, the better" basis and is as simple as can be whilst also avoiding any claims of greenwashing.

Isn't this what helps the industry most? Instead of complex and opaque calculations which require adjustment over time?

I cannot finish here without thanking impact's Advisory Board members, namely Shanan Gibson, Jihong He, Jan Melgaard and Andreas Schäfer for accepting the role, dedicating valuable time and helping us to navigate the complex world of aviation's decarbonization.

1. impact members in 2023

In 2023, seven new members joined impact, bringing our membership base to a number of 40! Welcome Arena Aviation Capital, AV AirFinance, Cirium, Deutsche Anlagen-Leasing, Investec, PwC Ireland, and Stephenson Harwood LLP.

2. Review of impact's workstream activities in 2023

Transition Finance: Airlines

Led by Deniz Billion (Natixis) and Philip Greene (HSBC)

This workstream counts on the expertise of representatives from Natixis, HSBC, Castlelake, LBBW, Helaba, BayernLB, Avinomics, and Cirium who worked on the elaboration of a lending finance framework concept that implements impact's milestone concept. Preceding discussions focused on how to incentivize decarbonization efforts of an airline through specific clauses in financing contracts between lenders and airlines.

The finance framework concept entered a review phase which consists of feedback calls with various airlines from different regions. For the purpose of these calls, impact recorded a brief introduction video on its milestone concept which was presented to the airline interviewees in advance of the call. Airlines were asked for their view on the general comprehensibility of the milestone concept, the feasibility of its application and aspects for consideration.

Following the analysis of the airline feedback received, the workstream will review, if applicable, its finance framework accordingly and publish the final version as an addendum to impact's White Paper[1] on "The milestones to decarbonize aviation".

Transition Finance: Lessors

Led by Guido Schmitz (MUFG) and Claudia Ziemer (Azorra)

impact's TF Lessor workstream is composed of colleagues from MUFG, Azorra, Arena Aviation Capital, Helaba, Castlelake, Natixis Investment Managers, Bank of China, KFW, NordLB, Cirium and Avinomics.

In 2023, this workstream's objective consisted in developing a finance framework for leasing companies that implements impact's KPIs and milestone concept, similar to the framework concept that had been elaborated previously by the TF Airlines workstream.

In the preparation phase of this framework, discussions revolved around some fundamental questions, like:

- How to assess a Lessor from an ESG perspective?
- What reporting requirements do Lessors have from airlines and how can this be implemented in leasing agreements?

[1] https://impact-on-sustainable-aviation.org/shared-files/1023/?Impact-White-Paper_Milestone-Concept_February23-2.pdf&download=1

As a result of these discussions, the workstream concluded that the same KPIs impact defined to measure the CO_2 emissions of an airline can also be applied to leasing companies and do not need to be adjusted. This led to the question on how the milestone concept can then be used to calculate a lessor's decarbonization progress and status.

A key challenge for the application of the milestone concept for leasing companies is the current lack of live data from most airlines which makes the use of carbon calculators inevitable.

Following the definition of the KPI and milestone concept application for lessors, the workstream elaborated a leasing finance framework which is now entering the review phase. In this phase, the workstream conducts feedback calls with leasing companies aiming to test the comprehensibility and feasibility of it's finance framework. In a final step, this framework will be published as an addendum to impact's White Paper on "The milestones to decarbonize aviation".

Enabler

Led by Dr. Peter Smeets (360 Asset Finance) and Jean Chedeville (Natixis)

The purpose of the Workstream Enablers is to develop the technical and regulatory understanding for SAF and carbon capture as the two technology paths that are essential for the decarbonization of aviation. Furthermore, the workstream is dedicated to monitor changes in legislation and regulation worldwide as well as the funding landscape for SAF and CC.

Colleagues from 360 Asset Finance, ishka, Natixis, Natixis Investment Managers, Commonwealth Bank of Australia, ING, BayernLB, LBBW, KFW, Arena Aviation Capital and M2P Consulting exchange know-how and discuss the development of key projects for SAF production and carbon capture, particularly in Europe and the US. In addition, market insiders and takeaways from conferences, working groups, and meetings at political level on the topic of SAF are shared.

In addition to examining the current situation in terms of legislation and regulation, the workstream deals with the question of what needs to be done to meet the regulatory requirements regarding the required SAF production volumes. This touches on the issue of financing a production landscape for SAF that represents such a balanced profile in terms of risk-return aspects that it is investable for investors as an asset class.

To answer this question, a great deal of work is needed to understand at all levels what the obstacles, expectations and approaches of the relevant parties (producers, airlines, banks, investors, politicians) are in order to develop a solution step by step.

Science

Led by Prof. Dr. Andreas Schäfer (University College London) and Prof. Dr. Thomas Conlon (University College Dublin)

The workstream is primarily dedicated to conduct scientific research with the objective to scrutinize the alignment of impact's methodologies and approaches with the 1.5°C target. For this purpose, the workstream that is composed by members from University College London, University College Dublin, Avinomics and Commonwealth Bank of Australia collected, analysed and compared data on 1.5°C trajectory scenarios by 2050 published by different relevant organisations. Based on the findings, the workstream wrote a scientific paper on transition finance in aviation and the feasibility of the 1.5° target by 2050. The conclusion of this paper is that the temperature target of 1.5°C is not suitable for financial application since it is based on decarbonization assumptions that comprise a high level of uncertainty. Instead, more tangible targets and approaches that measure absolute CO_2 emissions, like net-zero and impact's milestone concept with decoupling as a key indicator, should be applied. The paper will be submitted to an A-level scientific journal.

Reporting

Led by Matthias Reuleaux (NordLB)

In impact's reporting workstream colleagues from NordLB, ishka, MUFG, PwC, KPMG and Cirium jointly work on the creation of impact's biannual publications which feature latest industry developments, expert views on trending aviation finance topics and interviews with next generation industry experts. For this purpose, the workstream aims to involve perspectives of different industry professionals with alternating backgrounds to allow tackling "sustainable aviation" from a variety of angles.

Moreover, the reporting workstream elaborated an ESG questionnaire aviation financiers can use to inquire relevant sustainability data of their airline clients. To further develop this project, the work-stream is currently exploring options to build-up a centralised digital platform to store ESG-relevant data for aviation financiers.

3. impact's conference participation 2023

impact's visibility saw a marked increase. Our participation as panellist, keynote speaker and moderator at numerous conferences is testament to the relevance of impact's mission.

Date	Event
Jan 17-18	Airfinance Journal Europe
Feb 2	TOZCA – Aviate Towards Net Zero Aviation Workshop
Mar 29	Ishka ESG: Playing your part in sustainable aviation
May 4-5	Aireg SAF conference
May 11-12	Airline Economics Aviation & the Environment Summit Dublin
May 16	CENA Berlin
May 22	ATAG Briefing on the financing of SAF
May 24	Ishka Aviation Finance Festival
June 7-9	Sustainable Aviation Futures Europe
June 19	ISTAT Sustainability Symposium, Paris Airshow
June 20	impact Event Paris
June 21	MUFG Paris Air Show Aviation Conference
Sep 4-6	Fastmarkets Biofuels & Feedstocks Europe
Sep 14	ING Aviation Day
Oct 1-3	ISTAT EMEA
Nov 6-7	Aviation Carbon
Nov 20	ALI Global Aviation Sustainability Day

Dr. Ulrike Ziegler (President of impact on sustainable aviation) and Jörg Schirrmacher (Head of Aviation Finance at Helaba) during the Fireside chat at the Airline Economics Aviation & the Environment Summit in Dublin, May 2023.

Dr. Peter Smeets (CEO of 360 Asset Finance and Board member of impact on sustainable aviation) at the Sustainable Aviation Futures in Amsterdam, June 2023.

Dr. Ulrike Ziegler (President of impact on sustainable aviation) at the Aviation Carbon Conference in London, November 2023.

Dr. Ulrike Ziegler (President of impact on sustainable aviation) at the ALI Global Sustainability Day in Dublin, November 2023.

4. impact's members' call presentations in 2023

impact's bi-weekly members' call has the objective to build know-how and share information on relevant aviation sustainability topics. For this reason, impact invites expert speakers from different organizations and sectors who are all dedicated to foster aviation's decarbonization process.

In 2023, impact hosted the following expert talks:

'Sustainable finance taxonomy for the aviation sector'

Peter Wiener

Peter Wiener, Associate and Senior member of the Aviation team at Steer

Sustainable finance taxonomy for the aviation sector is part of Steer's work for the European Commission on establishing criteria for the inclusion of certain aviation-related activities within the scope of the EU's Sustainable Finance Taxonomy (Regulation (EU) 2020/852). The recommendations are still being debated and it is not clear if they will be included in the latest version of the Commission's Delegated Act which operationalises the criteria for inclusion in the taxonomy.

DG Fuels: A roadmap to scaling up SAF production'

Chris Chaput

Chris Chaput, President and CFO at DG Fuels LLC

DG Fuels will initially focus on the production of synthetic jet fuel then later synthetic diesel fuel. The DG Fuels Program will be implemented over 15 years at multiple locations and in multiple phases at each location. The electric power for the manufacturing processes will come largely from renewable solar and wind energy initially to be produced by other entities but later installed directly by DG Fuels. Excess electricity produced may be sold into the commercial power grid. DGF's method modifies the established Fischer-Tropsch system with several mechanisms that will decrease the

'Transition pathways towards net-zero climate impacts in aviation'

Andreas W. Schäfer

Prof. Dr. Andreas W. Schäfer, Professor of Energy and Transport at University College London and Director of the Air Transportation Systems Lab

Aviation emissions are not on a trajectory consistent with Paris Climate Agreement goals. This talks evaluates the extent to which fuel pathways–synthetic fuels from biomass, synthetic fuels from green hydrogen and atmospheric CO_2, and the direct use of green liquid hydrogen – synthetic fuels

from biomass, synthetic fuels from green hydrogen and atmospheric CO_2, and the direct use of green liquid hydrogen—could lead aviation towards net-zero climate impacts. Together with continued efficiency gains and contrail avoidance, but without offsets, such an energy transition could reduce lifecycle aviation CO_2 emissions by 89–94% compared with year-2019 levels, despite a 2–3-fold growth in demand by 2050. The aviation sector could manage the associated cost increases, with ticket prices rising by no more than 15% compared with a no-intervention baseline leading to demand suppression of less than 14%. These pathways will require discounted investments on the order of US$0.5–2.1 trillion over a 30 yr period. However, these pathways reduce aviation CO_2-equivalent emissions by only 46–69%; more action is required to mitigate non-CO_2 impacts. The presentation is based upon a recently published study, conducted jointly between the UCL ATSlab, the MIT Laboratory for Aviation and the Environment, and the Department of Civil and Environmental Engineering, Imperial College London.

'Tackling aviation's non-CO_2 climate impacts: the role of contrail management'

Conor Farrington

Conor Farrington, Head of Communications at SATAVIA

According to the United Nations IPCC AR6 (2021), contrails account for almost double the climate impact of direct CO_2 aircraft emissions. From 2025, airlines will need to report their non-CO_2 climate impacts (including contrails) under the EU ETS, creating MRV requirements alongside mitigation needs. In response to both, SATAVIA's DECISIONX:NETZERO platform forecasts and prevents aircraft contrails through flight plan modification, subsequently quantifying achieved climate benefit for MRV and/or voluntary carbon credit generation to incentivize adoption pre-regulation. After discussing the scientific backdrop, the presentation will introduce SATAVIA's technological, scientific, and operational approach, explore a case study focused on a specific Etihad flight, and consider ways ahead for tackling non-CO_2 in commercial aviation.

'Aircraft end-of-life: today situation, tomorrow's challenges'

Lionel G. Roques

Lionel G. Roques, Vice President Sales at Tarmac Aerosave

The life-cycle of aircraft is a crucial part of aviation's sustainability transition. Tarmac Aerosave recycled more than 300 aircraft since 2007. But how does the recycling process of aircraft and engines work? And at what point is aircraft end-of-life actually more environment-friendly than aircraft recycling? In which way will new technologies affect aircraft and engine reuse?

'Carbon reduction airline network costs and changing strategies'

Nigel Addison-Smith

Nigel Addison-Smith, Advisor on Finance & Strategy to the CEO at Azerbaijan Airlines

Carbon costs are potentially an existential threat for some airlines and at the very least will require business model changes. It is critical to understand how those carbon costs are developing over time and where. Developing strategies to evolve the network over time to mitigate risks and seize opportunities is vital to survival, continuing to deliver returns and manage stakeholders.

'Avoiding the greenwashing trap: Greenwashing, activists and aviation'

Dirk Singer

Dirk Singer, Head of Sustainability at SimpliFlying

KLM, Lufthansa and Ryanair are just three of the airlines that have been accused of greenwashing by climate activists. Airlines' sustainability claims are getting more and more scrutiny, and environmentalists are quick to take action against claims that do not stand up to scrutiny. Why is this happening? And what are the pitfalls to avoid?

'Delivering zero-emissions hydrogen flight'

Richard Moody and Jenny Kavanagh

Richard Moody, Chief Investment Officer at Cranfield Aerospace Solutions

Jenny Kavanagh, Chief Strategy Officer at Cranfield Aerospace Solutions

Cranfield Aerospace Solutions, a UK based company with a deep tradition in aerospace technology is seeking to deliver the world's first certified hydrogen aircraft by 2026. Richard Moody (CIO) and Jenny Kavanagh (CSO) will detail why Cranfield is uniquely positioned to deliver zero emissions hydrogen flight and explain the Project Fresson strategy, technology and engineering including why hydrogen is seen as the optimal energy source for regional aviation decarbonization.

‘Overview and brief update on EU climate measures addressing aviation’
Damien Meadows

Damien Meadows, Advisor on European & International Carbon Markets at the European Commission, DG Climate Action

With its Emission Trading System (ETS), the EU established a tool to reduce economy-wide greenhouse gas emissions with the overall aim to achieve a climate neutral EU by 2050. The ETS is currently in its fourth phase which will have important key outcomes for the aviation industry. This includes the financial support for sustainable aviation fuels (SAF) and the appropriate implementation of ICAO’s Corsia scheme.

‘SAF development in Ireland‘
Jan Melgaard

Jan Melgaard, Executive Chairman at FPG Amentum

SAF is the most important pathway to net zero for aviation. Commercial scaling is that main challenge and strategic capital is one of the constraints. Lessors have a keen interest in taking a proactive role in facilitating and providing such capital. Aircraft Leasing Ireland (ALI) is working actively on developing SAF in Ireland as one of its work streams.

‘Decarbonising aviation‘
Chris Brown

Chris Brown, Head of Aviation Strategy at KPMG Ireland

Chris provided us with a frank overview of the decarbonization challenge facing aviation, including opportunities and risks learnt through our work in the sector, and what that means for passive investors and the financial sector. This includes the overall CO_2e picture for the sector, demand supply imbalance for SAF as well as the realistic fleet evolution, and what AAM does and doesn’t mean for decarbonizing aviation.

‘EU Taxonomy‘
Emma Giddings

Emma Giddings, Partner at Norton Rose Fulbright

This presentation discussed the EU Taxonomy Regulation and the recent draft Delegated Act containing proposed technical screening criteria for aviation finance and financing. We discussed the operation of the EU Taxonomy and its relationship to non-financial reporting, the new proposed technical screening criteria and recent updates for example, with respect to the use of sustainable aviation fuel. We also discussed some of the practical challenges for the industry when seeking to categorize transactions by reference to the proposed technical screening criteria.

'A smart approach to decarbonization: EU Carbon allowance investing for airline lessor'

Kerri Moss, Jan Ahrens, Phil Beattie

Kerri Moss, Founder at Impetus Carbon

Jan Ahrens, CEO at SparkChange

Phil Beattie, Head of Strategic Partnerships at SparkChange

Impact Investing. Learn about carbon trading and how it will affect the aviation industry as EU regulations become increasingly stringent. We'll begin with a brief background on the European Emissions Trading System (ETS), followed by an explanation of how lessors can hedge financial risks resulting from the system, whilst simultaneously creating positive, permanent environmental impact. Followed by a Q&A with the CEO of SparkChange, Jan Ahrens.

'How to Create and Finance a Clean Revolution in Aviation'

David Victor

David G. Victor, Professor and Chair of the Peter Cowhey Center on Global Transformation in Innovation and Public Policy at University College San Diego

The aviation industry has proven highly adept at announcing bold plans for net zero. Achieving those plans is another matter, not least because disruption is costly and also the best routes forward are shrouded in uncertainty. This talk will examine how uncertainty effects incentives and technological change, along with what all that means for the future of aviation.

'The role of optimized ATM operations on the path to Net Zero'

Eric Perrin

Eric Perrin, Deputy Head of Aviation Sustainability Unit

Operational improvements aiming at improving the carbon footprint of aircraft - and related airport - operations are a key set of measures where benefits can be achieved in the short to medium term, and as such may be considered low-hanging fruit in the move towards a net zero carbon emissions target. This presentation will identify the role played by ATM in the 2030 and 2050 horizons, current performance, present and future solutions, associated challenges, and also briefly address non-CO_2 aspects.

'Don't get caught in a spin: greenwashing and climate litigation'

James Collins, Patrick Bettle

James Collins, Partner at Stephenson Harwood LLP

Patrick Bettle, Managing Associate at Stephenson Harwood LLP

Greater media, consumer and regulatory attention on environmental issues has brought the topic of 'greenwashing' into sharper focus for many corporate actors. In this talk, we will look at 'greenwashing' test cases in the aviation sector, themes that emerge from climate litigation in other industries, the potential impact of upcoming regulatory change and other important considerations for aircraft investors and asset managers.

'CORSIA and Article 6 Carbon Markets'

Lev Gantly, Rob Stevens

Lev Gantly, Partner at Philip Lee LLP

Rob Stevens, Director of Product Development at Climate Impact Partners

As the Carbon Offset and Reduction Scheme for International Aviation (CORSIA) enters its first meaningful phase in 2024, for the first time airlines will have obligations to purchase and surrender carbon credits to comply with scheme. At the same time, the carbon markets are going through a transitional restructuring as they move to the rules and architecture of the Paris Agreement. In the session, we will outline how these factors are affecting market sentiment and the carbon credit supply/demand balance for CORSIA, and discuss potential carbon market engagement strategies for actors across the aviation ecosystem.

'Carbon Markets and Taxonomy in Asia'

Hui Ling Teo

Hui Ling Teo, Partner at Reed Smith LLP

In her presentation, Hui Ling described the current developments on Asian carbon markets and gave an overview of taxonomies and other regulatory initiatives in various Asian countries with the aim to provide an update on designing finance to support the energy transition in transportation.

'Introducing the Roundtable on Sustainable Biomaterials: Fostering Sustainable Landscapes'

Elena Schmidt, Arianna Baldo

Elena Schmidt,
Executive Director at RSB

Arianna Baldo,
Programme Director at RSB

As the world is looking for options to transition from a fossil-based economy to a more bio-based and circular one, the Roundtable on Sustainable Biomaterials (RSB) convenes leading organisations to share their experiences in supporting countries and regions in this effort, and the lessons learned for global bioeconomy development. Elena Schmidt, RSB's Executive Director, will share the challenges and opportunities within these 'landscape-level' partnerships– grounded in RSB's robust sustainability framework – to understand and analyse feedstock opportunities in Southeast Asia, Africa and Brazil for regulators, financiers, and project developers to build the biocircular economy. You will also be introduced to the RSB's recently launched Book & Claim System, an important building block in fostering the complex scaling of sustainable fuels.

5. Aviation sustainability: Views from the aircraft appraiser community

As part of impact's annual collection of industry data and reporting initiatives, we have reached out to the appraisal community and queried nine established appraisers on their opinion with regards to challenges around proposed and soon to be implemented sustainability directives and regulations. We surveyed the appraiser community with six key questions and have incorporated their individual comments herein.

The commercial aircraft appraiser community remains a vital component of the aviation financing industry. A fundamental part of aircraft valuation analysis is the assumptions around economic and technical life. As appraisers continue to take a long-term approach with their 20-year future value forecasts a forward-looking view must be taken on aircraft types that will still be viable given expected regulatory applications. This was true when Stage 4/Chapter 4 noise restrictions were imposed in the early 2000s which forced operators to rationalize their fleets out of noisier aircraft that could no longer be flown into the world's largest airports. Consequently, it is now expected that jurisdictions independently will aim to restrict higher polluting aircraft types as a measure to control the environmental impact as they start to capture and report data for disclosure filing requirements such as Europe's Corporate Sustainability Reporting Directive (CSRD) and similar reporting compliance mandates.

Similar to assessing the efficiency of an aircraft, it is inevitable that in the near to mid-term the market will start to distil the "winners" from the "losers" when evaluating emissions output. Most appraisers feel that their role is to reflect the market, rather than lead it when it comes to valuation considerations around emissions. This will become a delicate balance of valuing for both today, but also ensuring that any future value considerations are not blind to a potential shortening of useful life of a specific type due to excessive emissions output, or the inability to be registered in a more restrictive jurisdiction.

Currently, when asked, most appraisers have not incorporated any sustainability guidance on their review of current values with regards to the potential challenges of any imposed directives. That being said, when asked specifically about the economic lives of aircraft such as the Boeing 737NG and Airbus A320ceo families, 60% of appraisers agree that economic lives will shorten, but not for all types. Some believe that a lack of regulatory consistency makes assessing the impact on value challenging, while others cite sustainability remains one of many factors, and will take a backseat to overall market demand.

Conversely, half of the appraisers agreed that there will be no change in the value gap between current and previous generation narrowbody technologies when SAF mandates come into place, while placing additional emphasis on the ultimate challenges around the global availability and cost of SAF. For some it is too early to tell what the exact impact of SAF mandates might be on values given some of the unknowns and the level of regional uptake.

When it comes to the production of carbon, most appraisers have not factored this at all into their future value forecasts, while 10% have stated that their models are very sensitive to aircraft age and ultimately the cost of burning fuel. With some citing a deeper analysis around the forecasts for fuel and cost of carbon, which ultimately directly factors into aircraft values. Others have incorporated the potential obsolescence and degraded efficiency of types as an indirect impact. A common theme around jurisdictional differences remained prevalent when pointing to differing regulations and regional variations on assessing fees and industry support.

Ultimately, a majority of appraisers believe that for those aircraft types that have higher emissions when compared to their peers, future base values will change in terms of higher depreciation rates. However, for some this also goes along with the usual market maturation of a type and the natural obsolescence due to newer technologies, so there would not be any abnormal value change outside their original forecasts.

As always appraisers come to the table with their own methodologies and views on these very complex subjects. It is important to always recognize that there is no real "one size fits all" approach when it comes to the valuation and forecasting of commercial aircraft, and as sustainability efforts continue to be globally mismatched, aircraft values will continue to incorporate varying levels of arbitrage as regions aim to eventually align.

Bryson Monteleone, Senior Advisor to Aviation Finance Advisory Services at PwC Ireland and Chairman of the ISTAT Appraiser Program

impact's appraiser survey was designed by the reporting working group with input from impact's finance and lessor workstreams. impact would like to thank PwC Ireland and the Outgoing Chair of the ISTAT Appraiser Program, Bryson Monteleone, for their work collecting and summarizing the answers.

6. A view from Japan: How key players in Japanese aviation finance think of ESG

impact speaks with two major Japanese financial institutions with deep roots in aviation to understand how ESG priorities are reshaping their approach to the sector.

Japanese financial institutions have long been a geographical center of gravity for aviation, and their influence over the sector has only grown stronger over the past decade. Four of the ten largest aircraft leasing companies in the world are wholly or partially owned by Japanese firms, Japanese banks are one of the industry's largest debt providers, and a vast number of aircraft operating leases involve Japanese investors via JOL and JOLCO structures.

To better understand the ESG pressures that major Japanese firms are experiencing, impact reached out to Tokyo Century Corporation, a major financial firm with a strong foothold in asset leasing, and MUFG Bank, Japan's largest bank and one of the world's largest.

Starting signals for their ESG journey

Much like many financial institutions elsewhere, MUFG tells impact that the bank's decision to join the Net Zero Banking Alliance (NZBA) in June 2021 is one of the biggest events to have influence ESG expectations for aviation finance. Under NZBA, MUFG is committed to measuring and transitioning its investment and financing portfolios along a pathway to net zero with targets for 2030 and 2050. MUFG subsequently joined impact in 2022 which it credits for giving it "a better understanding of the challenges facing financiers in the aviation space," MUFG's Global Aviation Finance Office Head of Portfolio Management, Conor Murphy, shares.

Tokyo Century, which through its leasing operations is closer to the everyday operation of aircraft assets, sees ICAO's Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) as perhaps the biggest event to drive ESG expectations for aviation. "The start of the CORSIA pilot phase in 2021 has accelerated and prioritized ESG in the whole of aviation industry, including the aviation finance market in Japan," Fumika Mikami, Manager for Airline Marketing & Portfolio Management at Tokyo Century's Aviation Finance Division, tells impact.

Japanese government policy initiatives

Government policy signals for the Japanese aviation industry have also reverberated through the financing community. Both MUFG and Tokyo Century point out that the Japanese Ministry of Economy, Trade and Industry (METI) has proposed a target to replace 10% of jet fuel consumption by Japanese airlines with SAF by 2030. The Japanese Government is also contemplating provision of economic support in the form of grant for capital investment and feedstock supply as well as exemption on import tariffs (subject to budgetary approval by the Japanese National Diet).

In 2022, an organization called "Act for Sky" was established to promote the recognition of SAF and facilitate the creation and scale-up of a domestic SAF industry. Initially spearheaded by JAL, ANA, JGC and Revo International, Act for Sky now consists of 31 members including MUFG, which joined in July 2023. In 2022, METI and the Ministry of Land, Infrastructure, Transport and Tourism (MILT) also jointly established a "SAF Public-Private Council" to promote cooperation between domestic fuel suppliers and the Japanese airlines to develop, manufacture, and build supply chains for domestically produced SAF that is internationally competitive.

The Japanese government has also been supportive of sustainable finance transactions through a financial support programme for green and sustainability linked bond/loan coordinated by the Ministry of the Environment (MOE), which has been accessed by – among other corporate borrowers – Japanese airlines.

Separately, METI in 2022 established the "Green Transformation (GX) League" forum for companies involved in the green transition endorsed by over 600 companies and participated by over 400, including Tokyo Century Group, which transited its position from "endorsement" to "participation" in April 2023 "in order to be more involved in it", Mikami tells impact.

Putting priorities into practice

Both Tokyo Century and MUFG have made the financing of efficiency-driven asset choices one of their main approaches to aviation's sustainability challenge. This includes, in the case of Tokyo Century, unconditional purchase commitments of 121 new-tech aircraft by California-headquartered leasing subsidiary Aviation Capital Group (ACG) as of December 31, 2022. Beyond this shared action point, the two institutions have been taking other approaches tailored to their strengths.

In addition to setting Scope 1 and 2 net-zero emissions objectives by 2040, Mikami shares that Tokyo Century has been working on "circular economy" concepts and applying these through its value chain affiliated businesses. They include parts and service business operator (GA Telesis), engine leasing (Gateway Engine Leasing), airline Jetstar Japan (of which it owns a 16.7% [voting interest]), and ACG.

MUFG in the meantime is placing itself as a "thought-leader" in the aviation sustainability space, offering in-house expertise to support the industry. Among its financing activities, MUFG is also "exploring" sustainability-linked financing solutions and carbon-offsetting measures, Murphy tells impact.

The role of sustainable finance

Japanese financial institutions are recurringly involved in sustainable finance transactions in aviation, both as arrangers, structuring agents, and lenders. Murphy believes this trend is likely to continue. "It is highly likely that sustainability-linked structures will become an important option for Japanese financiers in the future. MUFG, for example, acted as Structuring Agent for a JPY 26.5 billion transition-linked financing for JAL in March 2023," he explains.

Sustainability-linked transactions allow financial parties to monitor the performance of sustainability performance targets (SPTs) and determine incentives or penalties based on their attainment. In the case of MUFG's JAL financing, the airline must maintain total greenhouse gas emissions in 2025 at 2019 levels and reduce total emissions to less than 90% of 2019 in 2030. "These targets set a clear commitment from JAL to work on decarbonizing its operations," Murphy shares. Moreover, such financing options "evidence a commitment from Japanese corporates to take net-zero seriously and underpin the wider desire within Japan to transition to a low-carbon economy."

Tokyo Century in August 2023 also executed a JOLCO transaction incorporating sustainability values into equity financing and a loan, for an Airbus A350-900 aircraft introduced by Air France, and Tokyo Century aims to "initiate and expand" its sustainability-linked product business "with new partners going forward." At a group level, Tokyo Century has also procured a total of approximately JPY 450 billion (approximately $3 billion) through sustainable finance including green bonds, sustainability-linked loans and positive impact loans since 2018.

Japanese peers and expectations

Mikami notes that ESG topics have become "commonplace" at industry conferences in Japan in the past few years. "Especially, the number of conferences specialized in ESG started to increase around 2022 in Tokyo, which felt like a change." Mikami notes that ESG disclosure amongst Japanese firms in the aviation finance sector has also increased, including TCFD-aligned reports. In the case of Tokyo Century's aviation business, scenario analysis in line with TCFD was disclosed in April 2022.

The embracing of sustainable finance has been a catalyst for cross-sector discussions on sustainability. Mikami notes that Tokyo Century's recent A350 transaction "led to an increase in discussion opportunities, not only with existing relationships, but also with new prospects."

Beyond commercial aircraft lending and investment, both firms are starting to finance technologies and infrastructure to enable a transition to cleaner flight. In 2022, Tokyo Century subsidiary ACG entered into an agreement in principle with Volocopter (a Tokyo Century affiliate) to develop financing solutions that will assist with the sale of Volocopter's family of eVTOL aircraft for up to $1 billion.

In July 2023, ACG announced its investment in the United Airlines Ventures Sustainable Flight Fund, which supports start-ups focused on decarbonizing air travel through SAF research, technology and production. The lessor is also communicating with OEMs and industry bodies "to understand new technologies, SAF and infrastructure development and to explore ways of encouraging the scale-up of SAF usage across the ACG fleet."

Meanwhile, MUFG, as arranger, closed the first green loan in Japan for a SAF manufacturing facility to REVO International in May 2023. "Domestic SAF is indispensable to achieving decarbonization in aviation, and it's use is expected to expand significantly in the coming years. The JPY 2.2 billion term loan was used to develop manufacturing facilities for bio-diesel fuel (C-FUEL) and bio-jet fuel (SAF) from waste cooking oil," Murphy explains.

Fumika Mikami joined Tokyo Century in 2015 and currently serves as the Manager of Aviation Finance Division with responsibility for the portfolio management. She is the main spokesperson for all ESG matters related to aviation at Tokyo Century. Prior to joining Tokyo Century, Fumika was as an aircraft engineer by training with ANA and serves as one of the two technical managers within Tokyo Century.

Conor Murphy is Head of Portfolio Management at MUFG's Global Aviation Finance Office.
He is the head of EMEA's aviation portfolio management team with over a decade and a half experience in asset finance in transportation and infrastructure. Conor is also an active contributor to impact, of which MUFG is a member.

7. SAF Q&A: LanzaJet and the promise of ATJ SAF

LanzaJet is quickly becoming one of the most "heard about" SAF producers. What sets you apart and what are your production ramp-up plans?

We are working to accelerate the deployment of SAF globally, with our Freedom Pines Fuels plant coming online in early 2024. We are based in the U.S., but with projects in development in the U.S., the E.U, the U.K., Japan, Australia, India, and New Zealand. So far, LanzaJet has already announced planned production capacity of <300 million gallons of fuel (<900,000 metric tonnes) annually. We think we are well on our way to support the aviation industry's goal of net-zero by 2050. Disrupting an 80+ year-old jet fuel industry isn't easy, but that is what SAF companies like LanzaJet set out to do. We don't give up. We also act with a strong sense of urgency to have an impact today, as our global society and the aviation industry desperately needs commercially viable and scalable solutions.

Your Freedom Pines Fuels plant is set to start production in early 2024. What will be the contribution of this plant to lifting the world's SAF output and increasing its pathway diversity?

Freedom Pines will be the first of its kind to produce jet fuel from ethanol on a commercial scale and will be mechanically complete in January of 2024 and set to begin commissioning and start-up in Q1 of 2024. The plant's full production capacity will be 10 million gallons (30,280 metric tonnes per year of sustainable fuels – 9 million of SAF and 1 million gallons of renewable diesel). This output is a significant boost to the 12 million gallons of SAF the U.S. produced in the first 10 months of 2023.[1]

SAF plants like Freedom Pines Fuels are also helping to revitalize rural communities across the world. LanzaJet's plant in rural Soperton, GA has created over 250 direct jobs during the construction process, along with an estimated 30 direct and 25-50 indirect jobs during ongoing operations. A pretty meaningful infusion of revenue, jobs, and life into rural towns across the U.S. and the world.

The LanzaJet Freedom Pines Fuels site also represents the first plant of the next generation of SAFs – really positioning the industry to scale, leveraging the abundant low-carbon ethanol supply that exists today. Other commercial pathways that exist in the market today (HEFA) are already beginning to see a cap in the near future of production output, but ATJ technology can leverage the same feedstocks as processes like Fischer-Tropsch and Power to Liquids, making it extremely scalable.

Being the first of anything isn't easy and partnerships at all levels have been essential to building LanzaJet Freedom Pines Fuels in Soperton, GA, USA. LanzaJet's investors, funders, partners, and supporters have been critical to getting the company to where it is today and paving the way for future growth.

[1] https://ethanolproducer.com/articles/epa-211-billion-rins-generated-under-the-rfs-in-october

What role have US government policies played in supporting the Freedom Pines Fuels project?

For any nascent and growing industry – supportive policy incentives and encouraging mandates help drive change and pave the way for growth. That's true for SAF as well.

U.S. government support has been instrumental in bringing this project and others like it to life. Both federal legislation like the Inflation Reduction Act as well as increasingly popular state-based incentives have specific funding support for SAF production and usage, helping to catalyze growth by reducing risk in this relatively nascent industry. These incentives have been critical as LanzaJet has built its Freedom Pines Fuels plant and for the broader SAF industry. Fair, equitable, and durable policies are key in encouraging production of SAF relative to other renewable fuels in the market today. Establishing a level playing field for SAF as well as meaningful duration on policy incentives will be important signals to the market as investors consider supporting the growth of the industry.

LanzaJet's SAF and Renewable Diesel fuels meet and exceed all the performance criteria to qualify for the incentives for SAF found in the Inflation Reduction Act's 40B SAF Blender's Tax Credit and for D4 Advanced Biofuel/Biomass-based Diesel Renewable Identification Numbers (RINs) under the U.S. EPA's Renewable Fuel Standard. The company's fuel also qualifies for incentives under numerous state low carbon fuel standards, the ICAO's Carbon Offsetting Reduction Scheme for International Aviation (CORSIA), and other renewable fuel programs outside the U.S.

Despite the availability of supportive policies in the US, LanzaJet is also exploring the possibility of building or providing technology to SAF plants in other parts of the world including Europe and Australia. What regulatory opportunities or market incentives drives you to these regions?

That's correct. In addition to LanzaJet's commercial facility in Soperton, the company is partnering across the world to advance the global scaling of SAF, with projects underway in India, Japan, the U.K., Europe, Australia, and New Zealand.

The prospect of energy security and a cleaner future has motivated countries and regions to adopt SAF mandates and accelerate production. This requires working collaboratively across public and private sectors, which LanzaJet is doing today. In Australia, for example, our ATJ technology will be used at the country's first ATJ SAF production facility in partnership with Jet Zero, Qantas, Airbus, and the Queensland Government. In New Zealand, LanzaJet has been selected by Air New Zealand and the federal government to undertake a study for domestic SAF production. For these and other global projects, LanzaJet hopes to leverage local feedstocks in the area to help facilitate the development of ATJ plants like LanzaJet Freedom Pines Fuels, but at an even larger scale.

At LanzaJet, we often work with our shareholder and partner, LanzaTech, which has a leading carbon transformation technology that produces 2nd generation ethanol. In many countries around the world, the combination of our two companies deploying our respective technologies creates a powerful combination of leading innovation to enable many countries to use domestic feedstock to create sustainable fuels.

What gives LanzaJet confidence for the growth of ATJ as one of SAF's major pathways, not just in the US, but worldwide?

With LanzaJet's proprietary Alcohol-to-Jet technology, created in partnership with the U.S. Department of Energy's (DOE) Pacific Northwest National Lab, we can take any source of sustainable, low-carbon ethanol and convert it to SAF and renewable diesel. We can use anything from carbon offgases to municipal solid waste to energy crops and more. We believe that of the proven and approved technologies to make SAF, LanzaJet's ATJ technology is the most versatile and scalable technology in the market. In 2018, we were successful in achieving ASTM approval for ethanol to SAF as a pathway which used our LanzaJet ATJ research and data. Since then, we have continued to develop the ATJ technology into a viable, commercial and scalable process.

Because LanzaJet is able to tap into any source of low-carbon ethanol, it is incredibly versatile and scalable. The core building block, the ethanol molecule, is an incredibly efficient building block for SAF. With ethanol, LanzaJet is able to build up to the exact specification we need to make SAF and / or renewable diesel. With other technologies on the market, often the building block they're starting with has to be broken apart, leaving some degree of waste and thus inefficiency.

Further, with our proprietary technology, our drop-in fuel can reduce greenhouse gas emissions by 80% or up to carbon negative, depending on the source of ethanol used. Better still, it reduces particulate matter by 95% and has a higher energy density than traditional fossil jet fuel.

The SAF industry is poised to grow exponentially over the coming years. A recent report[2] by Coherent Market Insights predicts that the SAF industry will grow from a $460 million a year industry in 2022 to a $20 billion a year industry by 2030. With such growth, there is incredible opportunity not only to reduce aviation's carbon footprint, but also to revitalize rural economies where many of these plants – like LanzaJet's Freedom Pines Fuels – are built.

[2] https://www.globenewswire.com/en/news-release/2023/07/17/2705523/0/en/Sustainable-Aviation-Fuel-Market-Revenue-to-Surpass-US-20-79-Billion-by-2030-Says-Coherent-Market-Insights.html#:~:text=Burlingame%2C%20July%2017%2C%202023%20(,61.2%25%20from%202023%20to%202030.

8. impact interviews aviation's next generation: Melanie McAleese

impact sits down with the aviation industry's next generation of leaders to understand their sustainability motivations and concerns, and speak about personal interests, and the role their firms can play to drive aviation's decarbonization progress.

Melanie McAleese,
Associate Vice President Corporate Finance at SMBC Aviation Capital

Melanie McAleese is Associate Vice President of the Corporate Finance team at SMBC Aviation Capital, with a particular focus on cultivating opportunities within the sustainable finance space for the company.

Melanie developed SMBC Aviation Capital's first sustainability linked loan (SLL) framework and worked on the company's first SLL transaction which closed in September 2023. More broadly within Melanie's role on the Corporate Finance team, she has worked on the company's two issuances into the capital markets in 2023, and a wide variety of 3rd party banking transactions on both a bilateral and syndicated basis.

Melanie has worked at SMBC Aviation Capital since 2019 and has held roles across both the asset and liabilities sides of the business in both the Commercial Analysis / Pricing teams and Corporate Finance teams respectively.

Melanie holds a BSc in Financial Mathematics from University College Dublin and a Certificate in ESG Investing from the CFA Institute.

Q1. SMBC Aviation Capital was your first job out of university, what triggered your interest in aviation?

I found myself working in aviation relatively accidentally. I studied Financial Mathematics in University College Dublin (UCD) and in the final year of my degree, I started weighing up my options in terms of graduate programs and work placements. It was at this point that I heard one of my friends talking about aircraft leasing. This was completely new to me at the time, but when I did some research, it struck me as a really exciting opportunity to work with colleagues and customers dotted around the world, and a way to learn more about different cultures, places and people.

As I worked through the interview process in SMBC Aviation Capital and I met some of the great people who are now my colleagues, they all had the same thing to say- that this is a really dynamic and fast-paced industry and that no two workdays are ever the same. I was convinced that this would be a really good fit for me, and I haven't looked back since.

Q2. How has your career at SMBC Aviation Capital evolved since you joined the team?

In September 2019 I started working on the Commercial Analysis team, which is on the asset side of the business. This gave me an introduction to projecting rental cash flows, analyzing the different maintenance cycles of various aircraft parts, and really getting to know the ins and outs of the financial aspects of a lease. I spent just over two years on that team and then I moved to the liability side of the business, where I am today.

Currently, I'm working in the Corporate Finance team which raises funding for the business. Since I joined the team just over two years ago, I've had the opportunity to work on some important and large-scale transactions. To name a few, I worked on the $2.5 billion global syndicated banking facility which closed in 2022 to assist with our acquisition of Goshawk Aviation, in December of that year, for an enterprise value of $6.5 billion. Between April and October 2023, the team has also issued $1.65 billion of bonds into the capital markets. More recently, we closed our first sustainability-linked loan facility, which was something I was particularly excited about because sustainable finance has been an area of focus for me for the past two years.

Q3. Tell us more about that area of focus, what strategic priorities drove your interest in sustainable finance?

When I moved into the Corporate Finance team, it struck me that going forward, sustainability is going to play a growing part in a lessor's ability to raise capital. That is driven in part by the Net Zero mandates which many of our lenders now operate under, and their membership of groups like impact or the Net Zero Banking Alliance etc., which drive the decarbonisation agenda of these lenders. This dynamic creates the opportunity for us as a lessor to come up with solutions so that our lenders and investors can continue to do business with us well into the future – we want to prove to them that we can tie sustainability objectives to the capital that they have at play with us.

Q4. What's special about your recent sustainability-linked loan and what performance indicators does it hinge on?

It is the first sustainability-linked financing facility for our business and, as far as we are aware, amongst the investment-grade lessors. The terms of the financing are indexed against two key performance indicators or KPIs, one environmental and one social. On the environmental side, we chose an intensity metric which will allow us to communicate that our growth is becoming sustainable, while we continue to work on the longer-term decarbonization objectives centered around absolute reductions.

Looking at our social KPI, thankfully we have longstanding commitments to diversity including well-reputed industry initiatives. The initiative that we chose to leverage for the purposes of this loan was IATA 25by2025, through which we have pledged to look at the different levels of seniority within our business and pinpoint those levels for which gender balance needs to be improved, and to make these improvements by 2025.

Because this was the first sustainability linked loan for the business, we were really clear that we wanted to hold ourselves to the highest standards of integrity and transparency. This in mind, we approached and mandated a global leader in ESG ratings data and analysis, Morningstar's Sustainalytics to review the KPIs and targets underlying the transaction. They provided an independent assessment of the facility versus the sustainability-linked loan principles. On the data side, we source our emissions figures from a third-party carbon calculator, PACE, in order to ensure an appropriate level of independence. Finally, we have committed to external verification of our progress against the targets set out in our loan documentation on an annual basis going forward, in line with best practice.

We believe that this deal represents a first step towards ensuring our access to future diverse sources of capital. We understand that for some of our lenders, ESG will form a growing part of their credit committee decisions and consequently their capital allocation decisions. We feel that moving the dial towards sustainable financing will allow SMBC Aviation Capital to maintain its position as one of the most diversified lenders in terms of sources of funding in the industry.

Q5. What role can sustainable finance play in promoting the transition to a carbon neutral future among aircraft lessors?

We view sustainable financing as a means to tie capital to the objectives that are set out in our ESG strategy and for the market and our lenders to assess our progress against to these milestones. Sustainable finance could also play a part in promoting further disclosures by lessors or airlines. Beyond this, it's widely acknowledged in the aviation industry that lessors are amongst the players who have the most access to capital, and that sustainable (or green) finance can play a role in incentivising lessors to put this capital to play towards the scaling of decarbonisation technologies.

Q6. What do you see as the biggest obstacle for the decarbonization of airlines and lessors?

Aviation is one of the hardest-to-abate industries globally, and while it currently accounts for a relatively small percentage of global emissions (around 3%), we do know that this percentage is going to increase over the coming years as other industries decarbonise. As of now, there are no alternatives available in terms of emissions-free technology that could rival the current generation of commercial jets and SAF is also not scaling at either the price or quantity that we require as of yet, although we are determined that SMBC Aviation Capital will play its part in ensuring this happens.

Looking at SMBC Aviation Capital's own trajectory towards net zero emissions in 2050, in the longer term we are focused on a transition to the next generation of aircraft, be that hydrogen or electric, and also towards the scaling up and development of SAF. Two challenges that we anticipate as we work towards this goal are the scale of the investment required and the increased level of collaboration across the value chain. We will need to see further cooperation and innovation between OEMs, lessors, airlines, even government agencies and financiers for ourselves or for any other player in the industry to achieve these goals.

In the short term, as an industry we must also pay attention to the basics- this includes reporting and disclosure. This year SMBC Aviation Capital worked towards our first voluntary disclosure under TCFD, and we became aware of the lack of standardization in the industry in this respect. The small number of airlines and lessors who release any form of sustainability report, generally release a completely disparate array of different metrics under different methodologies, making it difficult to benchmark against one another or compare year to year. This makes it challenging to pinpoint what exactly the starting point is for the industry, and then to chart the trajectory towards Net zero from there. I think that's where we can really see the value of groups like Impact, who are suggesting a common set of metrics for the industry, because I don't think that any lessor or airline is going to be able to drive that standardization on their own.

Q7. At what stage do you think is SMBC Aviation Capital in its decarbonization journey?

We're currently the second-largest lessor by fleet size and, with that, comes an element of responsibility. We want to lead the decarbonization journey of the industry. For us, that journey began in earnest towards the end of 2021 when we published our first ESG strategy, which sets out a roadmap Net Zero emissions in 2050 and a number of iterative milestones to achieve this. We are working to fully embed that ESG strategy into our corporate strategy so that it can be factored into the commercial decisions of the business in future.

In the near term, one of the main milestones in our strategy is assisting our customers with their own decarbonization journeys. Last year we invested $53 million into high quality and rigorously tested carbon credits with the aim of ultimately assisting our airline customers towards CORSIA compliance. Going forward, we are focused on exploring opportunities on the development of sustainable aviation fuel (SAF) and how we can leverage the expertise of our shareholders to play a significant role in this area. We feel that we are uniquely positioned to make a difference here because of our strategic alignment with our shareholder group and their longstanding expertise the area of green energy and renewables.

We look forward to being at the forefront of new developments in ESG for the industry for many years to come, and to fostering much-needed collaboration to accelerate this progress.

9. Conclusion and outlook

2023

has been a bit of a bumpy ride and our industry still has a long way to go to reach net zero.
A lot has happened in the year, let's take a look.

We were off to a nervous start in January when rumours surfaced that aviation might be excluded from the **EU taxonomy.** This could have been quite problematic for Aviation, which is a highly capital-intensive business earmarked as a brown-ish industry. In turn, this could have translated into financiers turning an even more critical eye on aviation. Such an outome would not have been constructive; while there are no quick-wins for aviation there are short-, medium- and long-term solutions for decarbonization. Including aviation in the EU taxonomy acknowledges the industry's potential to transition while also putting pressure on the industry to foster cleaner technologies.

ReFuel EU finally hit the road, imposing SAF mandates starting from 2025 at 2% to 70% in 2050. The initiative is a key component of the EU's roadmap to achieve its climate targets. Whilst the mandate approach of the EU is flanked by the EU Innovation Fund and 20m SAF allowances that should help to cover the price gap between jetA and SAF it is not considered a perfect approach by the broader industry. While well-intensioned , there was a clear preference for supply side incentives provided through the Inflation Reduction Act in the USA. In any case, as of today, neither route will support the scaling of SAF to the extent necessary. To put things into perspective; global SAF supply in 2023 constituted a mere 0.15% of fuel demand (300mt). Moreover, the number of SAF plants coming on-line in the near- to mid-term (if not long-term) are unlikely to provide the required volumes.

ALI Day in November 2023 was another big call for cooperation and collaboration and Marie-Louise Kelly of Orix made a very strong point in her welcome address. The broader industry has come to realize that the topic of decarbonization is multi-layered and requires the involvement of multiple stakeholders and the willingness to share know-how and information. David Swan stated that we need to, "do what is doable,". .... We all recognize that this is only the beginning, ALI lessors are investing money in SAF studies and R&D. Will we see much investment beyond this? Will Ireland become a breeding ground for similar funds to the United Airlines Ventures Fund which unites airlines, OEMs and banks with a view to investing in SAF and innovative technology companies?

ICAO's CAAF3 meeting brings us on to another interesting subject. Whilst I did only re-watch parts of the event I was taken aback by statements of some member states suggesting that ICAO should not agree to any quantitative targets but stick to its "ambition," arguing that not meeting targets could damage ICAO`s reputation. Cries of 'greenwashing' anyone? In any case ICAO member states have found a consensus on an aspirational interim goal of a 5% reduction in the carbon intensity of aviation fuel by 2030. A step in the right direction reflecting ICAO's 2022 resolution supporting a long-term aspirational goal of net zero by 2050. Of course, tangible interim goals are key to evaluating progress and, if needed, change course.

Last but not least, we saw the closing of **COP28,** and what a "show-down" it has been. We have seen just how challenging it is for politicians and policymakers to agree on a MEANINGFUL joint statement that not only mirrors the seriousness of the situation but also highlights the world's approach to fossil fuels. The much-hoped-for exit from fossil fuels did not transpire but as UN Climate Change Executive Secretary Simon Stiell put it in his closing speech: "Whilst we didn't turn the page on the fossil fuel era in Dubai, this outcome is the beginning of the end." The commitment to triple renewable energy capacity and to double the rate of energy efficiency improvements by 2030 will hopefully provide much-needed momentum.

And here's to
2024:

The **Corporate Sustainability Reporting Directive** ("CSRD"), which is part of the EU Green Deal will hit the road. The reporting requirements are extensive, yet through sustainability reporting it is intended to increase transparency and help redirect capital flows towards sustainable investments in order to achieve sustainable and inclusive growth. Is this the time to align across stakeholder groups to ensure respective reporting is consistent and ease the burden of such reporting?

CORSIA, the Carbon Offsetting and Reduction Scheme for International Aviation, will transition from the pilot phase to the first phase. Like other means to decarbonization it comes with its own challenges. With the first phase being voluntary this also means that major growth markets like China and India, who have not signed up to CORSIA (yet), don't have to offset their emissions. But even countries that have adopted CORSIA will struggle, as the number of Eligible Emission Units (EEU) required to offset growth beyond 85% of the 2019 baseline emissions are not readily available as they are tied to so-called "Corresponding Adjustments", yet the underlying process for such adjustments can best be qualified as early stage. Corresponding Adjustments are required to avoid double-counting of emission reductions or removals. More work and more investments will be needed.

So, where does this leave us?

We must translate all this talk on "cooperation and collaboration" into firm action and form alliances of the willing to move the decarbonization of aviation forward in a meaningful way.

impact is a non-profit platform for investors in and financiers of airlines and aviation infrastructure aiming to be at the forefront of a new reality in aviation finance. Impact is comprised of five collaborative working groups designed to deliver a credible and transparent roadmap to reduce CO_2 emissions from aviation to net-zero by 2050. impact is funded by the pro bono contributions of members, including a group of leading global financiers in aviation.

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