



ICAO

ENVIRONMENT

ICAO Secretariat

Session 3 – Implementation Support (ACT-SAF Programme)

Agenda

Implementation Support



Session 3 : Implementation Support – ACT SAF Programme

- **CAAF/3 Global Framework: Building Block 3**
 - Introduction to Building Block 3 on Implementation Support
 - Update on ICAO ACT-SAF Programme
 - Feasibility Studies and Business Implementation Reports
- **States and stakeholders' presentations and views**
- **Q&A session**

ICAO Resolution A41-21 on Climate Change



“Means of implementation commensurate to the level of ambition, including financing, will promote the achievement of the LTAG” (A41-21, para. 17)



ICAO Resolution A41-21 on Climate Change

Relevant provisions from A41-21 on assistance, capacity building, and other means of implementation

Para. 12: ... share information ...

Para. 13: ... dissemination of economic and technical studies ...

Para. 17: ... means of implementation ...

Para. 18.a: ... facilitate... access to private investment capacities...

Para. 18.b: ... climate finance initiative or funding mechanism under ICAO ...

Para. 18.c: ... assistance and cooperation programme dedicated to LTAG ... ACT-SAF

Para. 18.d: **promote the voluntary transfer of technology...**

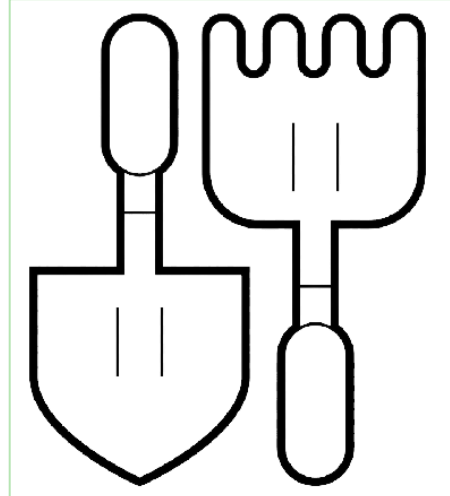
Para. 18.e: ... regular and substantial contributions to the ICAO Environment Fund...

Para. 20.d: ... assist Member States with studies, evaluations and development of procedures ...

Para. 21: ... to work together with relevant organizations ... recognizing ... largest ... CO2 emissions reduction **will come from fuel-related measures**

Para. 27.b: ... **consider the use of incentives to ... cleaner and renewable energy sources** ...

Para. 28: ... **facilitate the establishment of partnerships and the definition of policies** ...



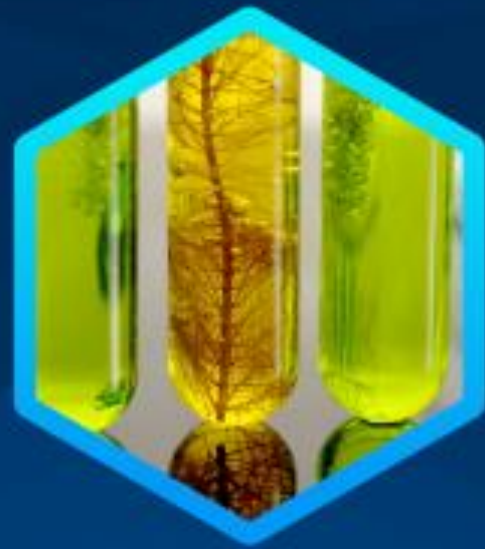


ICAO Global Framework on SAF, LCAF and other Aviation Cleaner Energies

Policy and Planning



Regulatory Framework



Implementation Support



Financing



- Supports global scale up of aviation cleaner energies – Collective Vision to reduce 5% CO₂ by 2030
- Provides clarity, consistency and predictability to all stakeholders on 1) policy and planning, 2) regulatory framework, 3) implementation support, and 4) financing – 4 Building Blocks
- Monitors the implementation progress on emissions reductions and means of implementation
- Aspiring to have cleaner energy production facilities in all regions by CAAF/4 (no later than 2028)
- To update the Vision at CAAF/4 on the basis of market developments

CAAF/3 Global Framework – 4 Building Blocks

1. Policy and Planning

- Global aspirational **Vision** to reduce international aviation CO₂ emissions by **5% by 2030**
- Each State's **special circumstances and respective capabilities**
- **CAAF/4** no later than 2028, with a view to update Vision
- **Collaborative effort** across different stakeholders, and encourage **State policies, action plans and roadmaps**
- Implementation **monitored** and periodically **reviewed**

2. Regulatory Framework

- **CORSIA eligibility framework as accepted basis** for SAF, LCAF and other aviation cleaner energies
- Increase the **number of SCS**, additional fuel production **pathways / life-cycle values**
- Parameters for **fuel accounting methodologies**, leveraging on CORSIA MRV system
- **Study of fuel accounting systems** to determine any possible ICAO role

3. Implementation Support

- **Robust, targeted and tailored** capacity -building and implementation support
- **Building on ACT-CORSIA and ACT-SAF programmes**
- Facilitate **partnerships**, and exchange of best practices
- Develop **policy toolkit/guidance** and support **State Action Plans**
- Support **feasibility studies, pilot projects**, which may facilitate access to investment
- Support **access to technology**

4. Financing

- **Advocacy and outreach** for greater investment in aviation cleaner energy projects, including UN and international financial community
- Welcome and request for **operationalization of ICAO Finvest Hub** to facilitate better access to public fund / private investment, to respond to Resolution A41-21, para 18. a)
- Expedite work to **consider the establishment of a climate finance initiative or funding mechanism under ICAO**, to respond to A41-21, para 18. b)

Building Block 3 – Implementation Support



3. Implementation Support

- **Robust, targeted and tailored** capacity -building and implementation support
- **Building on ACT-CORSIA and ACT-SAF** programmes
- Facilitate **partnerships**, and exchange of best practices
- Develop **policy toolkit/guidance** and support **State Action Plans**
- Support **feasibility studies, pilot projects**, which may facilitate access to investment
- Support **access to technology**

Building Block 3 – Implementation Support

17. All States should have access to the means to participate across all stages of the development and deployment of SAF, LCAF and other aviation cleaner energies, and all States and regions are encouraged to work together in a spirit of solidarity to ensure there is a truly global effort to contribute to, and benefit from, the work to reduce emissions from such aviation cleaner energies.
18. The global scale-up in production of SAF, LCAF and other aviation cleaner energies requires a robust and substantial capacity-building and implementation support programme. States, ICAO, industry, academia and other relevant stakeholders are encouraged to work together to deliver such a programme that:
 - a) recognizes the need for an expanded, robust, targeted and tailored support to account for the various stages of readiness across the entire SAF/LCAF value chain, taking into account different circumstances across States and regions;
 - b) facilitates partnerships, alliances and cooperation between States and all relevant stakeholders, including regional collaborations that may result in regional solutions that produce fuels efficiently;
 - c) includes exchange of information, sharing of best practices and technological developments among States, for which ICAO should provide a platform to facilitate this exchange and track progress;
 - d) supports States in their planning, development and implementation of national and regional policies that can be applied across all stages of fuel supply-chain, including the following potential policy components that form part of a non-exhaustive ‘toolkit’ (referred to paragraph 6 above):

20. The ICAO capacity-building and implementation support should be delivered in an efficient, effective and coordinated manner under the ‘one-ICAO’ approach, incorporating support for all stages of SAF, LCAF and other aviation cleaner energies development and deployment, and building upon the success of the ACT-CORSIA and ACT-SAF programmes. States are also encouraged to develop specific projects under the ICAO Technical Cooperation Programme.



Background to ICAO ACT-SAF Programme

ICAO Assistance, Capacity-building and Training (ACT-SAF) programme was launched in June 2022, prior to the LTAG agreement by 41st Assembly:

- Building upon the ICAO ACT-CORSIA experience, through **partnerships and cooperation**
- **Welcomed** and further action requested by 41st Assembly (*A41-21, para 18. c)*)
- Referenced in CAAF/3 Global Framework, **Building Block 3 – Implementation Support**
- In line with ICAO *No Country Left Behind* initiative



ACT-SAF objectives:

- **Create opportunities for States to develop full potential in SAF development / deployment**
- **Tailored support** for States in various stages of SAF development / deployment
- **Facilitate partnerships and cooperation**
- **Foster knowledge sharing and recognition of SAF initiatives around the world**

Overview of ACT-SAF Programme



A wide scope of initiatives under the ACT-SAF programme, aligned with ICAO Global Framework for SAF, LCAF and other Aviation Cleaner Energies – *Building Block 3*



ACT-SAF Partners



More than 153 States and Organizations have become ACT-SAF partners



How to become an ACT-SAF partner?

- ICAO issued an invitation State Letter ENV 9/1 – 22/56 (May 2022)
- Participation from States, academia, aviation industry, financial institutions, civil society organizations, etc. is welcomed
- Becoming partners by agreeing to the **ACT-SAF Terms and Conditions**

ACT-SAF Partners



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MID

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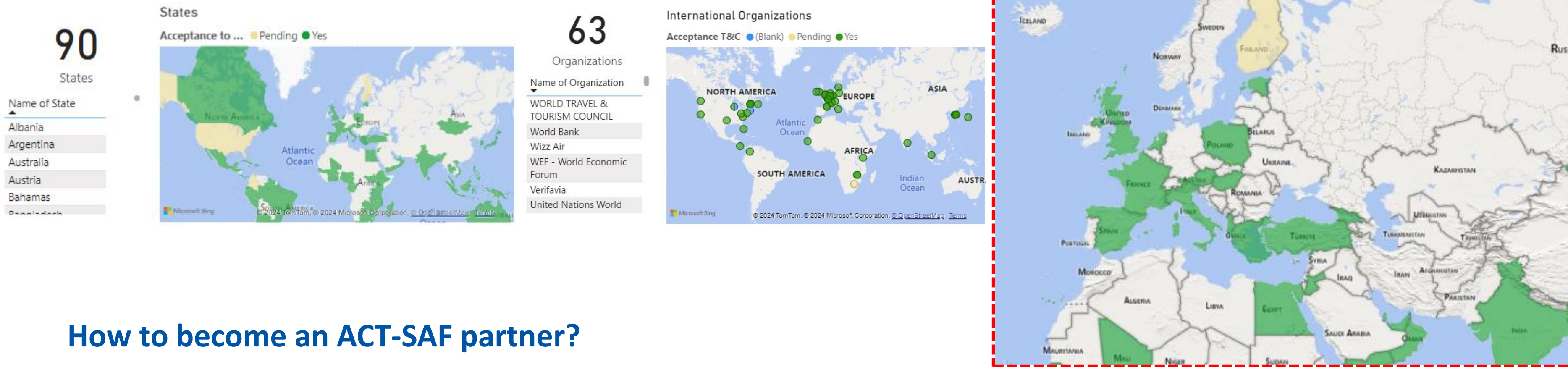
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NACC/SAM

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ESAF/WACAF



ICAO Tracker Tools and ACT-SAF Platform for Monitoring Progress



ICAO SAF Tracker tools (click for details)



Latest news (click for details)

Search Filter by State

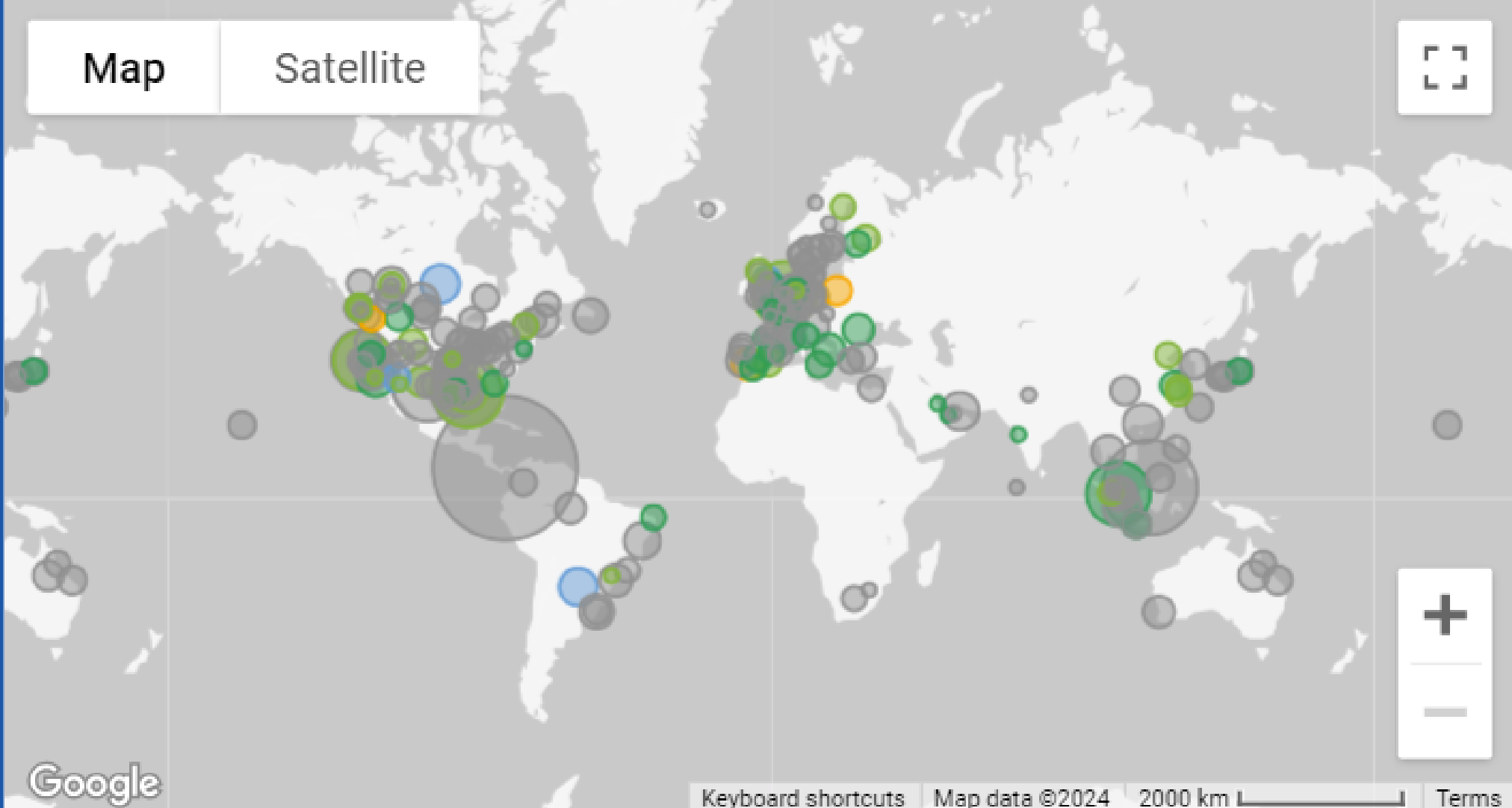
| Date | Link |
|--------------|---|
| Apr 15, 2024 | Neste to supply sustainable aviation fuel to Air New Zealand at Los Angeles International Airport |
| Apr 13, 2024 | Harwich factory to make jet fuel out of faeces in world first – Sustainable Aviation Fuel |
| Apr 12, 2024 | Chile announces SAF roadmap, targets production facility by 2030 |

ICAO tracker of SAF facilities

This tracker provides information on facilities (existing and announced) that could produce Sustainable Aviation Fuels.
 Note: capacity numbers refer to total capacity, including SAF and other renewable fuels. ICAO does not actively verify the status of announcements made in the past.
 contact officeenv@icao.int to suggest the inclusion of information

- COMPANY
Gurvor
- COUNTRY
United Kingdom
- ENTRY TO SERVICE
- FEEDSTOCK
- ASTM
- CAPACITY - ML
99.8
- LATEST LINK
<https://gurvorgroup.com/ne...>

LAST UPDATE: Feb 28, 2024



Capacity (ML/year) 0.0 + ● 9.8K

Facility Status

- 1 - Initial Announcement
- 2 - Under construction
- 3 - In service - producing other renewable fuels
- 4 - In service - producing SAF
- 5 - Front End Engineering Design (FEED)

Number of facilities

291

Announced capacity (billion liters/year)

97.7

Announced Capacity (kt)

78,241.69

Filter by

Status ▾

Country ▾

Company ▾

| Announcement Date ▾ | Entry in Service | Company | Country | City | projected capacity (Million liters/year) |
|---------------------|------------------|----------------|----------------|----------------------|--|
| Feb 28, 2024 | 2025 | Twelve | United States | Moses Lake, WA | 0.2 |
| Feb 28, 2024 | No data | Verso Energy | France | Tartas | No data |
| Feb 27, 2024 | No data | Avioxx | United Kingdom | No data | 6.3 |
| Feb 23, 2024 | 2026 | Cepsa | Spain | Palos de la Frontera | 624.7 |
| Feb 23, 2024 | 2026 | ANRPC | Egypt | Alexandria | 150 |
| Feb 20, 2024 | 2022 | Marathon/Neste | United States | Martinez, CA | 2763.3 |
| Feb 16, 2024 | 2026 | Velocys | United States | Natchez, MS | 132.5 |





ACT-SAF Training Series

ACT-SAF series offer comprehensive training to partners on an array of important SAF-related topics

- Online training, supported by experts from partner States and Organizations
- Partners benefit from immediate interactions with speakers, Q&A
- 13 sessions have been completed – more than 100 participants per session
- Training materials available in ICAO TV, YouTube and ICAO ACT-SAF website



ACT-SAF Series

Coordination with ACT-SAF partners identified that many States need conceptual training on SAF.

To address that, ICAO is developing the ACT-SAF Series of training sessions, to be held on a monthly basis. This will allow delivering comprehensive training to ACT-SAF Partners on an array of important SAF-related topics, ranging from sustainability, to policy, economics/financing certification and logistics.

The ACT-SAF Series will empower the ACT-SAF Partners with training material designed with the support of Supporting States and Organisations from the air transport, fuels and finance sectors, as well as academics and actors with niche expertise such as SAF reporting under CORSIA.

Want to participate on the ACT-SAF Series? Join ACT-SAF now (click here to access the ACT-SAF Terms and Conditions). Participation is open to all States and Organizations interested in further action on SAF.

| ACT-SAF Series | Date | Topics | Contributor(s) | Abstract | Video and Presentation |
|----------------|------------------|---|--------------------|--|------------------------|
| #1 | 25 November 2022 | An introduction to SAF | ICAO | <ul style="list-style-type: none"> Introduction to ACT-SAF Basics of SAF | Download Presentation |
| #2 | 25 January 2023 | SAF sustainability and reporting under CORSIA | ISCC RSB Verifavia | <ul style="list-style-type: none"> process for sustainability certification of SAF Reporting and verification of SAF Claims under CORSIA | Download Presentation |



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ACT-SAF Series

10 Episodes

ICAO's ACT-SAF Series aim to deliver comprehensive training to ACT-SAF Partners on an array of important Sustainable Aviation Fuel's related topics, including SAF sustainability, policy, economics, financing, certification, and logistics. It empowers the ACT-SAF Partners with training

Show more

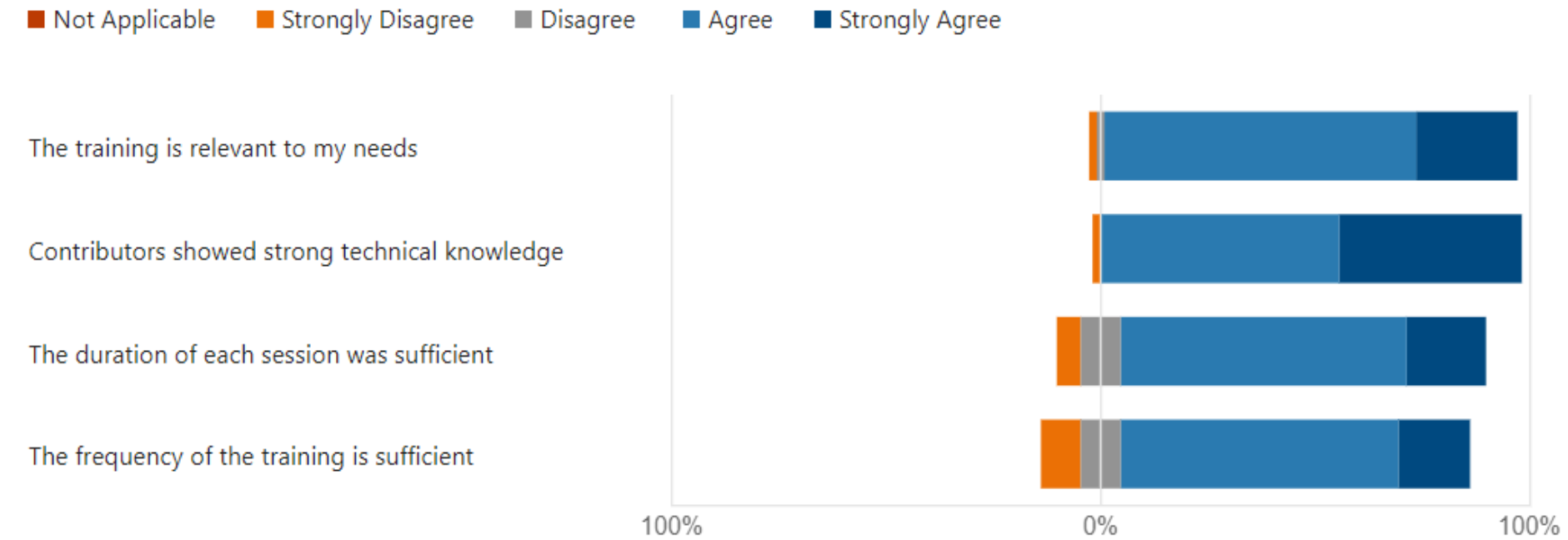
My list Share

ACT-SAF Training Series



Satisfaction with ACT-SAF series:

- Survey conducted in Dec 2023 to gather **feedback and views** of ACT-SAF partners, and to address their needs and expectations
- **91%** expressed that ACT-SAF series are meeting their expectations
- **Feedback on the future contents** will shape upcoming ACT-SAF series.



Beyond ACT-SAF Training Series



Identifying opportunities to enhance support:

- **Limitations of online training** – challenges in reaching all regions
- While it addresses general needs, **localized and tailored in-person training** can better address region/State specific needs, and increase opportunities for exchanges of information and best practices
- ICAO working on developing **training on specific topics** in collaboration with ACT-SAF partners, **seminars** with support of Regional Offices, and **updating materials based on past ACT-SAF training series**
- Additional contribution for collaborations are welcome



ACT-SAF feasibility studies



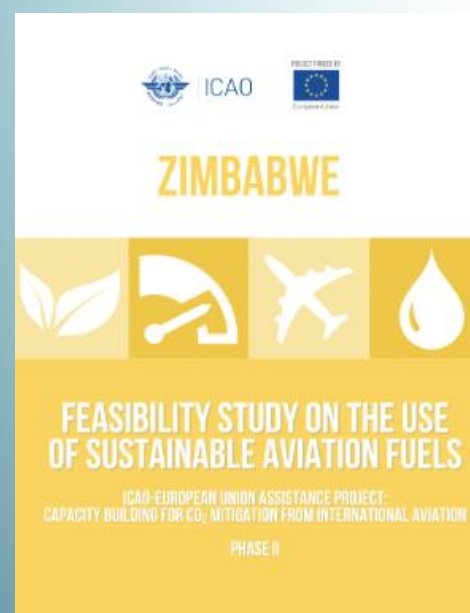
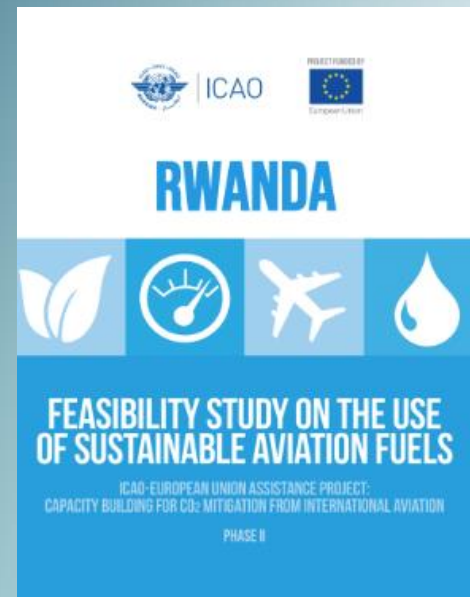
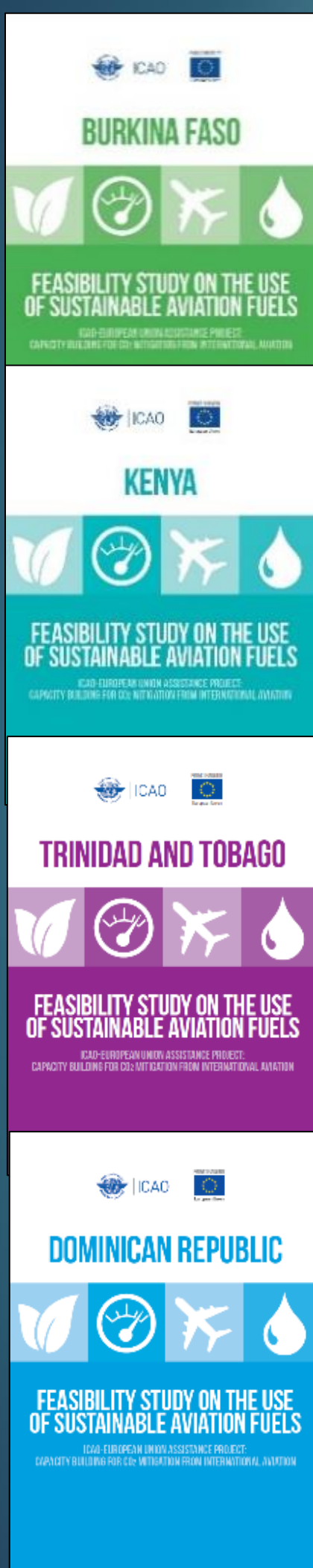
SAF feasibility studies provide States with the basis for SAF development/deployment

- To date, **7 SAF feasibility studies have been completed**
 - Burkina Faso, Dominican Republic, Kenya, Trinidad and Tobago (ICAO-EU project Phase I)
 - Cote d'Ivoire, Rwanda, Zimbabwe (ICAO-EU project Phase II)



Each feasibility study provides:

- Identification of **priority SAF pathways**, according to the **State's circumstances**
- Assessment of **implementation support** and **financing needs**
- Recommendation of an **Action Plan** aligned with the State's governmental policies related to SAF

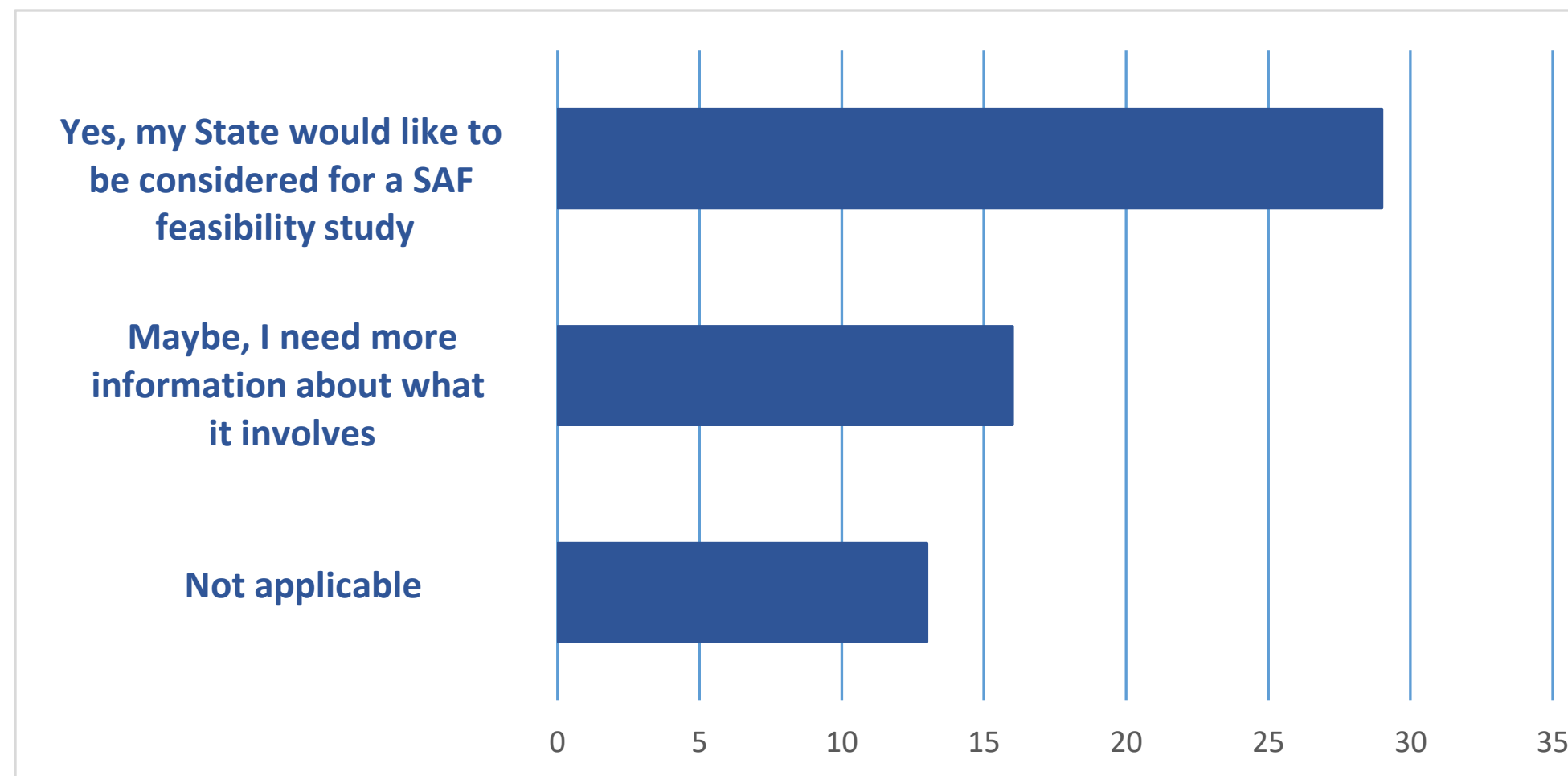


ACT-SAF Feasibility Studies



Strong need for support in SAF feasibility studies (ACT-SAF survey, Dec 2023)

- Half (50%) wanted to be considered for SAF feasibility studies, with additional follow up support (e.g. business case development) where applicable
- Others (28%) wanted more information before committing to a request
- Remainder (22%) expressed that this was not applicable
 - Responses mainly from organizations, States which have already completed feasibility studies
- **Implementation** of feasibility studies will be a key item on the agenda for ICAO in 2024





ACT-SAF Feasibility Studies and business cases

- **Need to scale up SAF feasibility studies by 2025 and beyond**
- **Further need to develop SAF business cases** (assessment of SAF project viability) to facilitate investment decisions for commencement of concrete SAF projects

Upcoming SAF feasibility studies & business cases (2024 - 2026) with contributions to ENV Voluntary Fund

| European Union | France | United Kingdom |
|---|--|--|
| <ul style="list-style-type: none"> • Support 10 SAF feasibility studies for African States and India • 1st project kick-off meeting in April 2024 | <ul style="list-style-type: none"> • Support 3 SAF feasibility and business implementation studies, focused in African States | <ul style="list-style-type: none"> • Support 3 SAF feasibility and business implementation studies, focused in African States |
| Netherlands | Austria | Airbus |
| <ul style="list-style-type: none"> • Support 3 SAF feasibility studies, for States in various regions | <ul style="list-style-type: none"> • Support SAF feasibility studies (TBD) | <ul style="list-style-type: none"> • Support SAF feasibility studies (TBD) |

- **Targeting ACT-SAF feasibility studies & business cases in 20 States by 2025, and 50 States by 2028**
- **More contributions are required for additional studies (app. USD 150K for each study)**

ACT-SAF Feasibility Studies



Template/Guide for ACT-SAF Feasibility Studies



July 2023 – SAF feasibility study template/guide:

- **Template** to highlight key features (State’s circumstances of State, priority pathways, identifying implementation support, and action plan) and to ensure consistency of information across different feasibility studies
- **Guide** to include examples of feasibility study results, showing practical approaches across various publicly available feasibility studies
- **Feasibility studies under ACT-SAF** are expected to adhere the template/guide

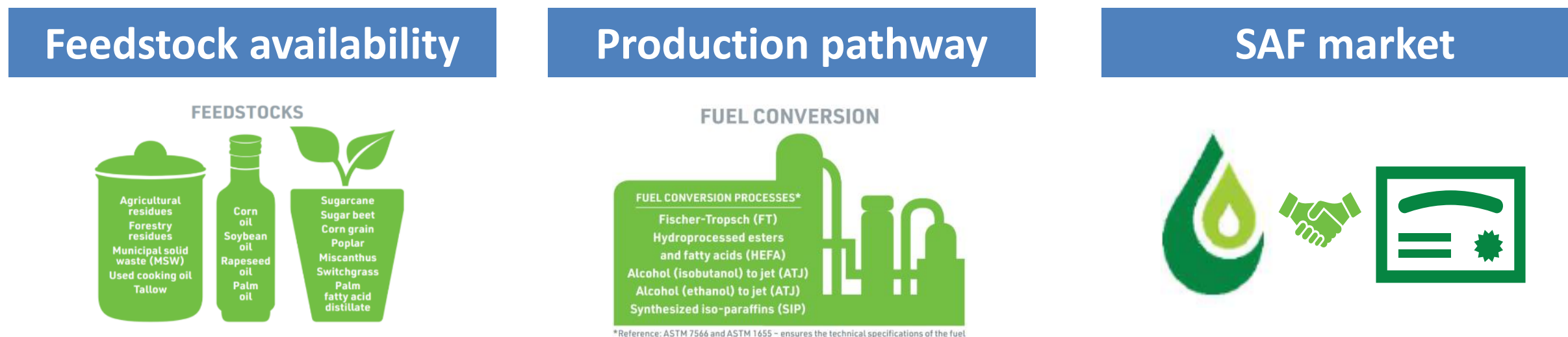


Template for SAF Business Implementation Report



Background: SAF business implementation report template

- As a follow up to the SAF feasibility study template/guide, ICAO has prepared a draft template to support SAF business implementation
 - Provides follow up support to States where preceding studies have already identified SAF feedstock/pathway prospects



- Received support from Kenya, Spain, Airbus, IATA, Oneiros Aerospace Limited, SAF Investor, SFS Ireland, and other individual contributors who participated in calls, and/or provided written inputs to progress the template

Template for SAF Business Implementation Report



Key elements:

1) Market analysis (scenario and assumptions)

- Deep dive into at least one shortlisted feedstock / pathway
- Setting out of the valuation model (e.g. discounted cashflow), and key outputs (e.g. NPV, MFSP)
- Provides technical information and assumptions, on SAF production facilities, with explanations
 - Location, supply chain, scale (e.g. energy infrastructure, demand)
 - General facility inputs (e.g. timeframes, capacities, lifespan)
 - Process and energy/utility inputs
 - Financial inputs (e.g. cost of capital, depreciation, IRR)



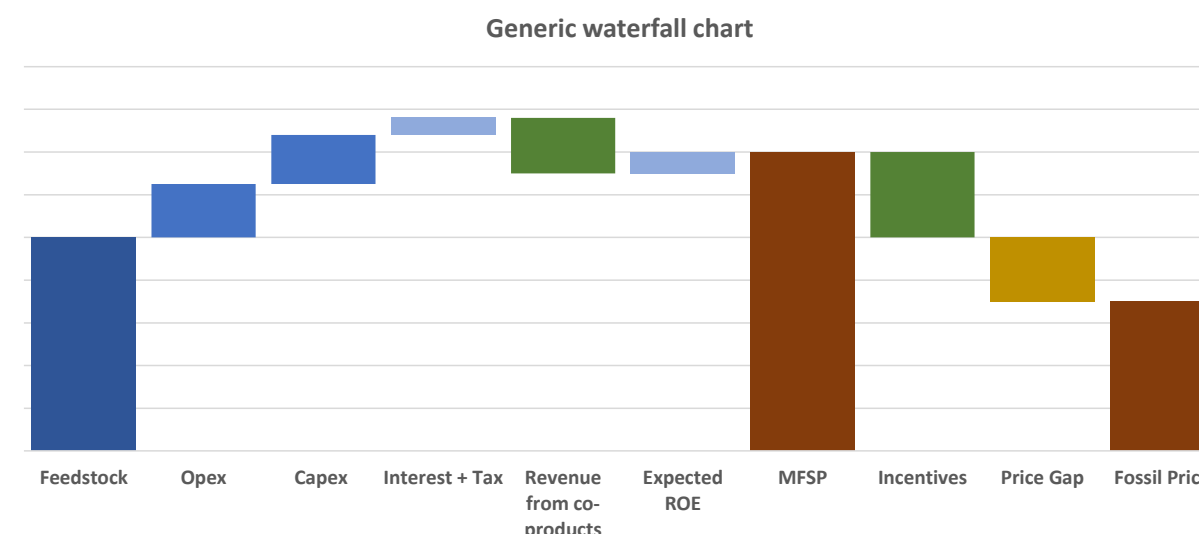
Template for SAF Business Implementation Report



Key elements:

2) Techno-economic assessment and results

- Applies input parameters from preceding section, to assess viability of SAF project in question
- Typically incorporates a waterfall chart with key outputs such as MFSP, price gaps, and CO2 abatement costs
- Sensitivity analysis to account for bear/bull variations in each input parameter – deviations from base scenario have to be explained
- Description of potential policies to address the price gap, if necessary



Template for SAF Business Implementation Report



Key elements:

3) Financial and operational assessment of the project

- **Development of the business case**, defining the economic and operational potential
- Operational assessments may provide information on
 - Facility general plot plans
 - Development timelines
 - Availability of local resources (incl impact on jobs)
- Assessments in cases of positive NPV (most ideal scenario), vis-à-vis negative NPVs (consideration of supporting policy)
- Assessments on potential regulatory issues (e.g. permits, expected timelines)
- Review of sustainability assessments, aligned with CORSIA eligible fuels
- Incorporate feedback from key stakeholders



Template for SAF Business Implementation Report



Key elements: 4) Risk assessment

- **Highlights challenges and barriers** that need to be addressed in order to realize SAF opportunities, with a focus on risks
- Common challenges include:
 - Scalability
 - Feedstock supply (seasonal variations, regional availability)
 - Technology risks
 - Competition with other refinery outputs
- Challenges may be evaluated in terms of probability, as well as impact to project success
- Mitigation means to address risks/challenges



Template for SAF Business Implementation Report



Key elements:

5) Business Implementation recommendations

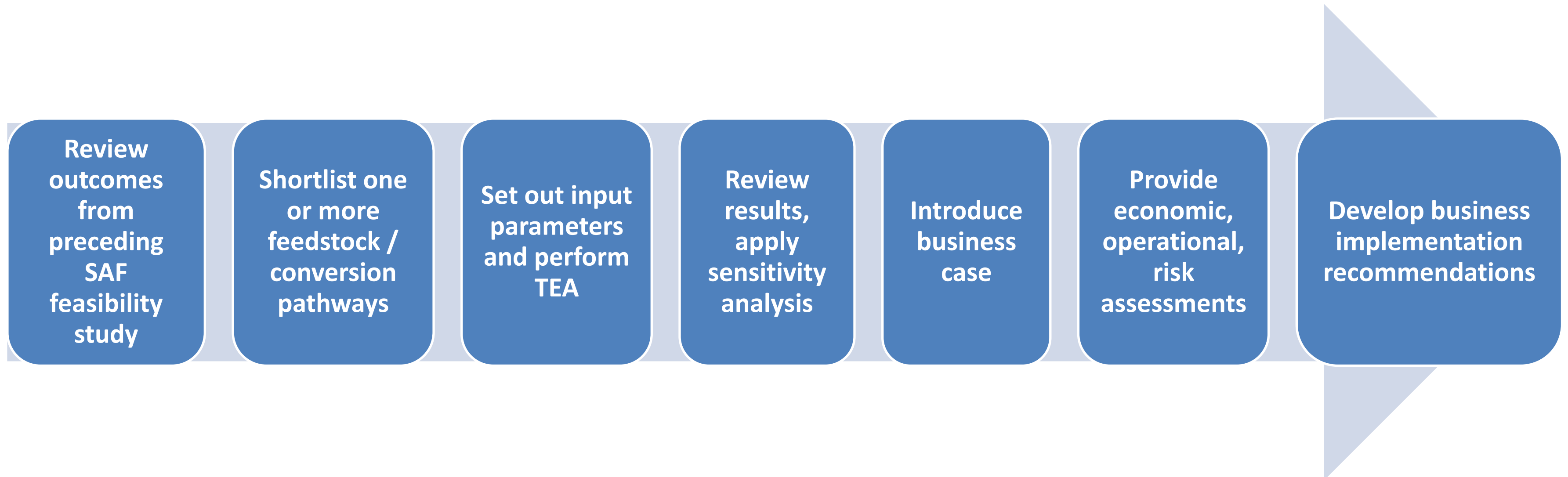
- **Explores final recommendations for the business case**
- Should aim to identify interested project partners – support towards setting out implementation structure
- Identification of potential financing, together with strategies for securing project finance
- Action plan to be aligned with the State's existing and planned policies related to clean energy/SAF development, as with linkages to the ICAO State Action Plan processes to support LTAG monitoring



Template for SAF Business Implementation Report




Overall flow of the development of a business implementation project




ACT-SAF Newsletter

- Latest training series
- Latest feasibility studies
 - Latest SAF projects
 - Latest news on SAF
- Events





ICAO



ENVIRONMENT
ACT»SAF
June 2024
Newsletter

The "ICAO Assistance, Capacity-building and Training for Sustainable Aviation Fuels (ACT-SAF) programme" is supporting States to develop their full potential in SAF, through specific training activities, development of feasibility studies, and other implementation support initiatives.

For more details on ACT-SAF click [here](#)

ICAO ACT-SAF Series

The ACT-SAF Series offers training sessions held on a monthly basis. It delivers comprehensive training to ACT-SAF Partners on an array of important SAF-related topics, ranging from sustainability, to policy, economics/financing certification and logistics.

Twelve ACT-SAF training sessions have been delivered to date, and are available at the [ACT-SAF Series](#) website.

ACT-SAF Series #12

The twelfth event of the ACT-SAF Series, held on 6 June 2024, focused on providing participants with presentations of ICAO State Action Plans and the inclusion of SAF, which covered the following aspects:

- Latest developments on ACT-SAF
- ICAO presentation on State Action Plans, including updates to ICAO Doc. 9988
- Presentations on the incorporation of SAF into State Action Plans by:
 - o Civil Aviation Authority of Singapore;
 - o Climate Change Management Department, Zimbabwe;
 - o Autorité Nationale de l'Aviation Civile, Côte d'Ivoire; and
 - o Civil Aviation Bureau – Ministry of Land, Infrastructure, Transport and Tourism, Japan.


The recording of this session and the presentation are now available at the [ACT-SAF Series](#) website.

Upcoming ACT-SAF Series

The upcoming ACT-SAF Series (date: 3 July 2024) will focus on SAF business implementation (BI) studies, and on techno-economic assessment methodologies that will support the development of such studies. In particular, ICAO will present the BI template, having received comments and inputs from ACT-SAF partners across the past few months.

Stakeholders from across the aviation sector are invited to engage, learn and collaborate on advancing SAF initiatives, reinforcing the industry's united effort in reducing its carbon footprint and achieving sustainability targets.

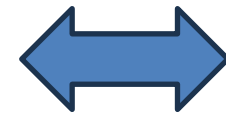
If you wish to receive regular updates and information on the ACT-SAF Series, participate in the events, and ask questions to our speakers, you can join the ACT-SAF programme now. Participation is open to all States and Organizations interested in further action on SAF following the acceptance of the [ACT-SAF Terms and Conditions](#) ([click here for more details](#)).





How can I contribute as ACT-SAF partner?

Contribute resources to support training, feasibility studies or business implementation report.



Inform ICAO ACT-SAF team if your States requests training, feasibility study or business implementation report.

- **Provide feedback on ACT-SAF, including proposals for new trainings**
- **Volunteer to contribute to an ACT-SAF training**
- **Provide feedback on the template/guide for feasibility studies**
- **Support the process for creating a template for business implementation reports (e.g. suggesting reference material)**
- **Contribute to the SAF trackers by informing the ACT-SAF team of recent developments**

Progress and evolution to ACT-LTAG



Sustainable resources required to ensure ACT-SAF progress and evolution

- **Training needs will evolve** towards tailored support to States in their varying stages of SAF, and with emerging topics
- Further enhancements to **tracker tools, guides/templates, outreach materials** to enhance outreach efforts
- Scaling-up of **SAF feasibility studies / business cases** by 2025 and beyond (with additional contributions to ENV Fund)
- Facilitating access to financing, with **close link with Fininvest Hub**
- Ensure **adherence to ICAO technical requirements / criteria**
- **Increase participations** of States, industry, financial community, etc. with support of **Regional Offices**
- Future expansion to **ACT-LTAG programme**





ICAO Roadmap Building Block 3 – Implementation Support Planned Actions

ICAO Roadmap BB3 – Implementation Support (ACT-SAF and ACT-LTAG programmes)



Planned Actions



- To deliver a **robust, targeted and tailored** capacity-building and implementation support, to promote the development and production of SAF, LCAF and other aviation cleaner energies
- ACT-SAF programme, including **guidance and training, sharing of best practices, feasibility studies and business cases, supporting development of project proposals, and partnerships knowledge sharing and technical cooperation** amongst States, industry and other stakeholders
- To extend ACT-SAF to add other emissions reduction measures (e.g. aircraft technology, operation) as **ACT-LTAG programme**

36



36



Implementation Support Q&A Session

Next:

Session 3 - Implementation Support – ACT SAF Programme

Implementation
Support



States and stakeholders will share information on their feasibility studies and business cases under the ACT-SAF programme, as well as other capacity-building and assistance initiatives on SAF, LCAF and other aviation cleaner energies.

2024 ICAO REGIONAL SEMINAR ON ENVIRONMENT

In collaboration with



NACC & SAM Regions

20 to 21, August 2024

Asunción, Paraguay



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ACT SAF

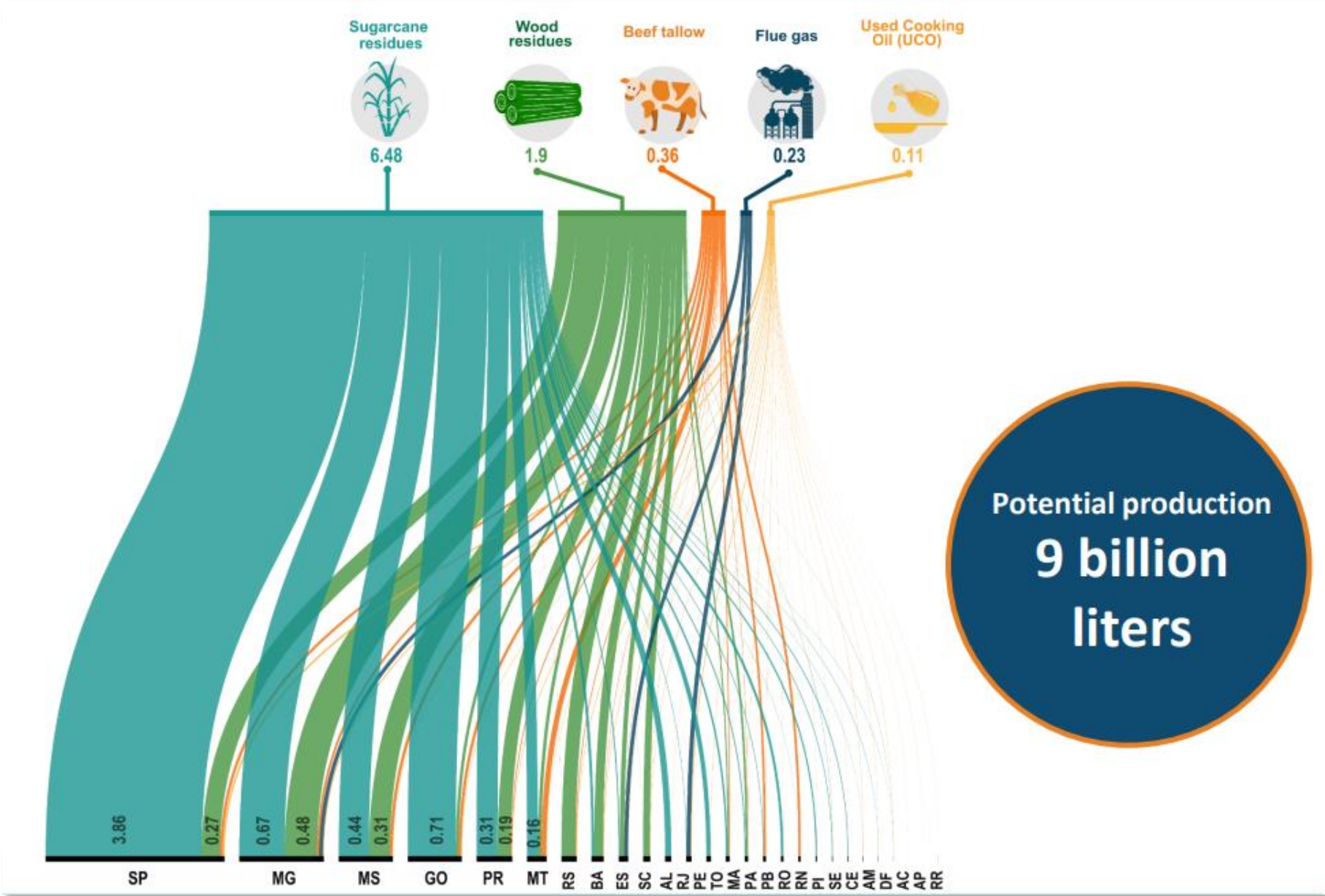
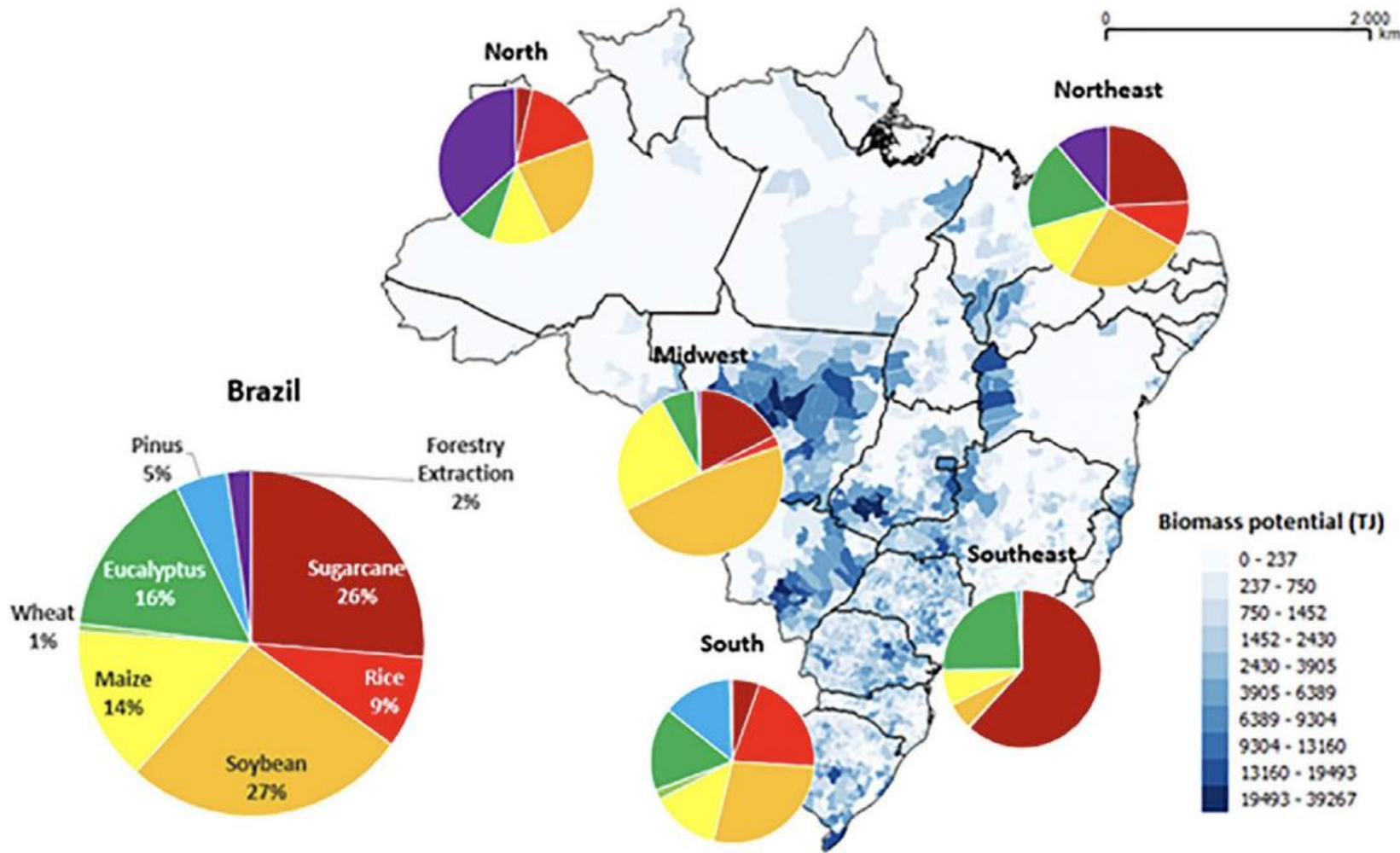
CORSIA



Política Nacional de SAF

- Brasil tiene tradición en la producción de biocombustibles (etanol y biodiesel) desde década de 1970
- Política Nacional de Biocombustibles - Renovabio
- Discusión integrada de SAF con el diesel verde

Política Nacional de SAF



Política Nacional de SAF

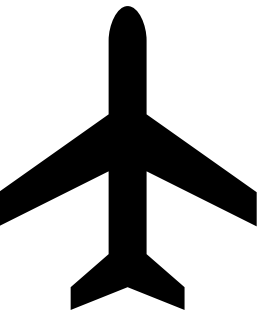
ESTUDO SOBRE
GOVERNANÇA E
POLÍTICAS PÚBLICAS DE
INCENTIVO À PRODUÇÃO
DE COMBUSTÍVEIS
SUSTENTÁVEIS DE AVIAÇÃO



Análise Econômica de
Diferentes Rotas de
Produção de Combustíveis
Sustentáveis de Aviação



Política Nacional de SAF



Marco regulatório definido

Mandato de redução de emissões por el uso de SAF



Investigación y desarrollo

Recursos federales para financiar investigaciones em matéria-prima y rutas tecnológicas



Tributación y financiamiento

Tributos reducidos para biocombustibles y acceso a financiación

Política Nacional de SAF



- Forum nacional de discussão de los desafios y oportunidades para la promoción de SAF en Brasil
- Actores públicos y privados
- Apoyo de los órganos sectoriales

<https://hotsites.anac.gov.br/conexaosaf/>

ACT-SAF



- Brasil ha firmado el ACT-SAF en 2022
- Participa en el ACT-SAF Series
- Apoyo a países africanos lusófonos

Desafíos para el SAF

- Harmonización de las metodologías de *carbon accounting*
- Rechazo a barreras técnicas/comerciales para el SAF
- Cooperación entre los actores públicos y privados
- Financiación y atracción de inversiones privadas

Thank You



2024 ICAO REGIONAL SEMINAR ON ENVIRONMENT

In collaboration with



NACC & SAM Regions

20 to 21, August 2024

Asunción, Paraguay



ICAO

ENVIRONMENT



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CORSIA





ICAO

2024 Regional Seminar on Environment

2024 ICAO REGIONAL SEMINAR ON ENVIRONMENT

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2050



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CORSIA



Hoja de Ruta SAF

Proceso

Contenido

Oportunidades

Estudio de factibilidad

Próximos pasos

Hoja de Ruta SAF

Proceso

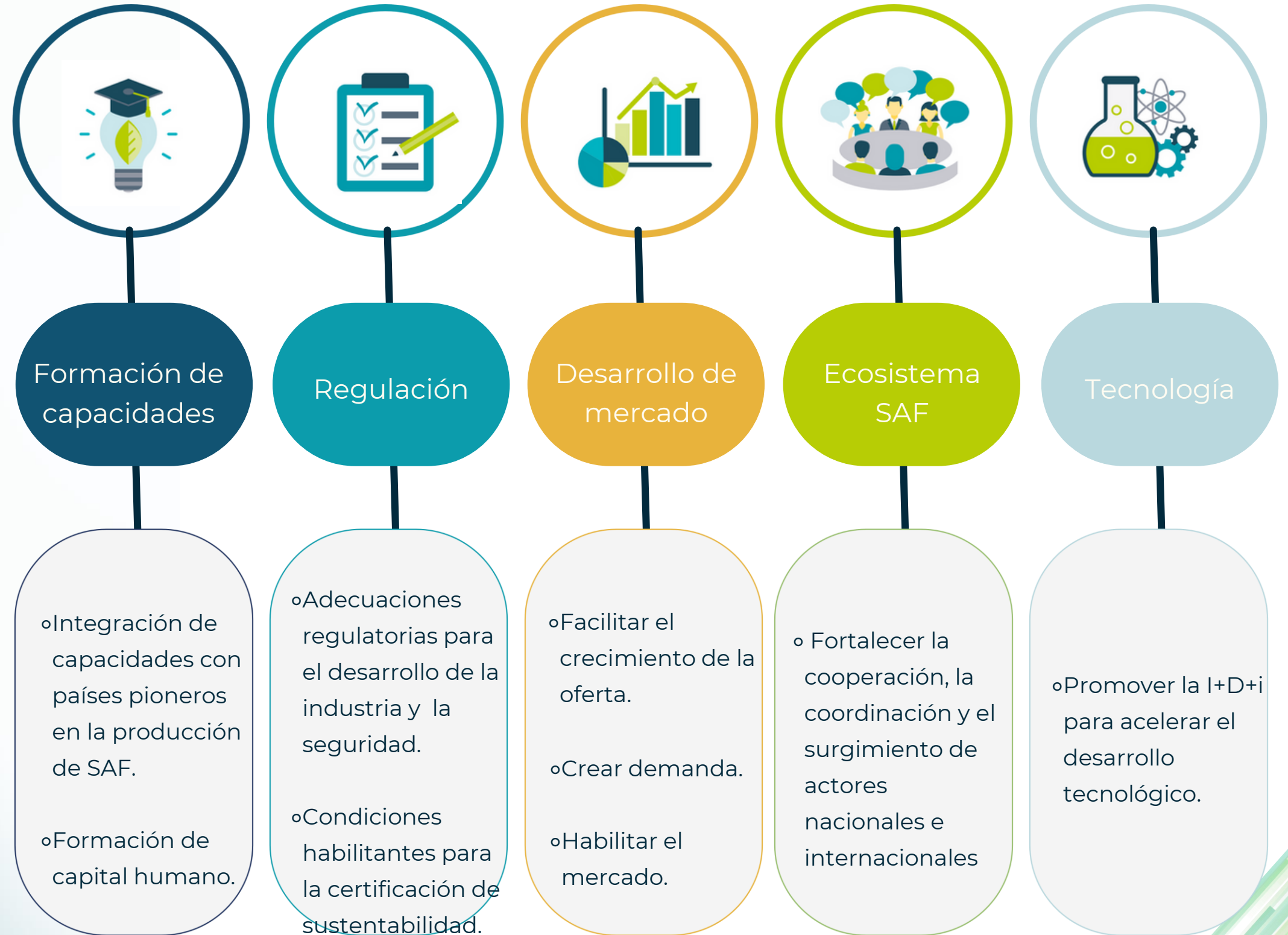


| Lanzamiento Mesa SAF (20/10/22) | Mesa 1 (24/11/22) | Mesa 2 (12/12/22) | Mesa 3 (12/01/23) | Mesa 4 (16/03/23) | Mesa 5 (31/05/23) |
|---------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | | | | | |



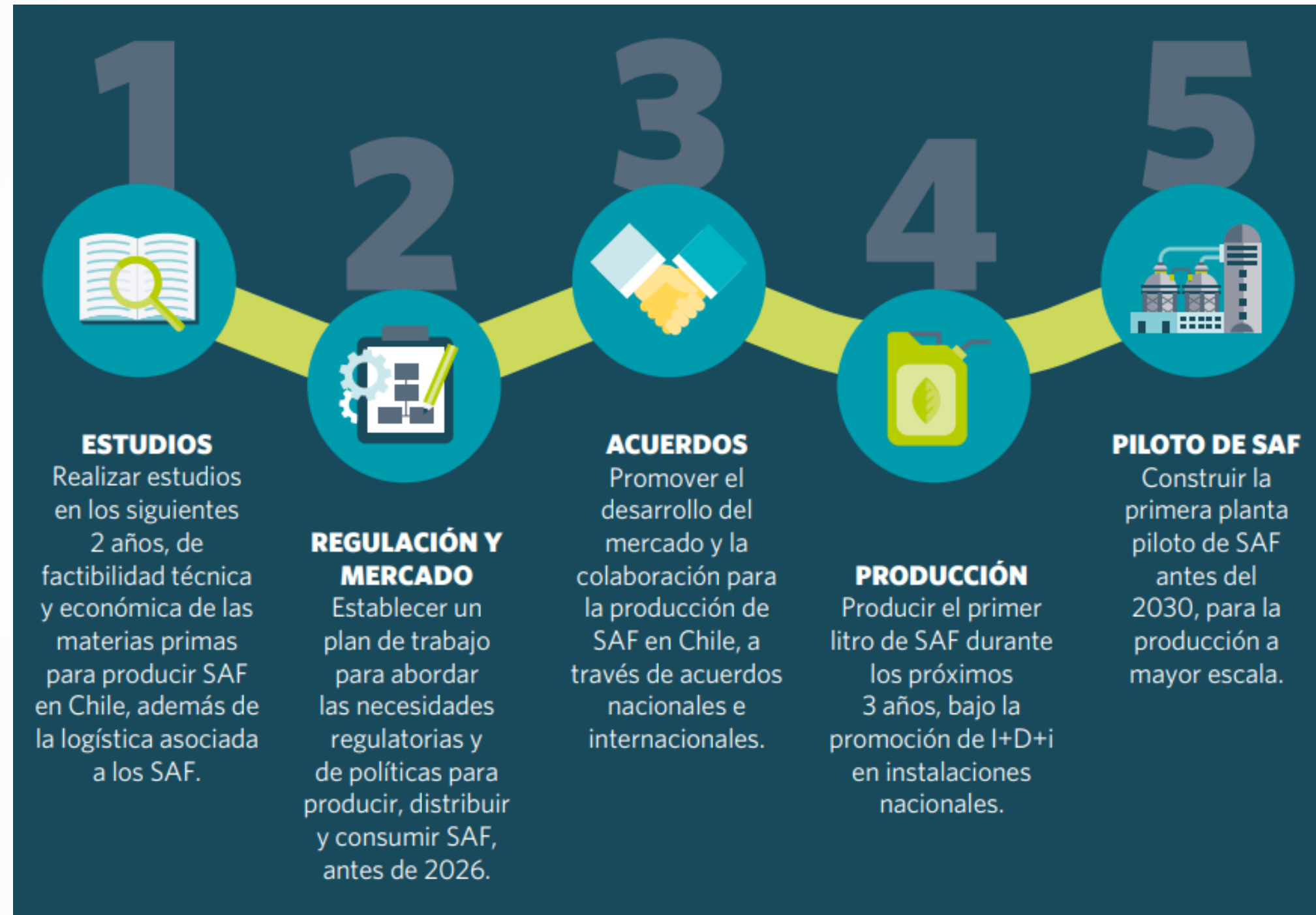
Hoja de Ruta SAF

Contenido



Hoja de Ruta SAF

Contenido



Hoja de Ruta SAF

Oportunidades



Aceites de cocina usados: existen empresas en Chile que operan recolectando aceites de cocina usados de industrias que lo utilizan en sus procesos productivos. El aceite recolectado es principalmente exportado, para posteriormente ser valorizado, entre otros, para la elaboración de biocombustibles.

Existe un potencial de recuperar estos aceites en la fuente donde se generan (por ejemplo, restaurantes), pudiendo destinarse a la producción local de SAF. Además, es posible revisar la incorporación de estos residuos en la Ley de Responsabilidad Extendida del Productor (Ley REP) como producto prioritario, lo que podría potenciar esta industria.



Biomasa forestal: esta materia prima posee múltiples usos en Chile, desde la construcción hasta la calefacción, focalizada esta última principalmente en la zona sur del país. Si bien la alta demanda de esta biomasa ha generado disponibilidad limitada, los gremios de la industria forestal aluden a que su disponibilidad podría acrecentarse si existieran planes para la gestión de residuos forestales que permitiera ampliar su oferta.



Biomasa de alto contenido lipídico: estos cultivos se caracterizan por presentar un alto potencial de conversión. Algunos ejemplos de estas materias primas, que no compiten con la industria alimentaria, son: las microalgas, la jatropha, la halófito y la camelina³⁸, las cuáles, dependiendo de sus características, pueden cultivarse en el mar, tierra adentro, en el desierto y/o zonas semiáridas. Chile debido a su variedad de climas posee una oportunidad para explorar estas materias primas.






Hidrógeno verde: dentro de las múltiples aplicaciones de esta molécula se encuentra la producción de combustibles sintéticos o *e-fuels*, mediante procesos que se denominan *Power-to-Liquid* (PtL). Chile, al poseer un alto potencial de energías renovables, tiene ventajas en la generación de hidrógeno verde, materia prima para la producción de combustible sintético, lo que también se encuentra reflejado en la Estrategia Nacional de Hidrógeno Verde.

Hoja de Ruta SAF

Próximos pasos






| Nombre | Descripción | Eje | Acción  |
|--|---|---|---|
| <p>Estudio ACT-SAF OACI</p> | <ul style="list-style-type: none"> Resultados: 1er semestre 2025. Estudio factibilidad de materias primas para producción de SAF. |  <p>Desarrollo de mercado</p> | <p>Levantamiento de información base para evaluar el potencial de producción y/o desarrollo de industria de los SAF (estudios de factibilidad de producción y disponibilidad de materia prima, brechas de capital humano, infraestructura, impacto medioambiental, social, entre otros).</p> |
| <p>Estudio de regulación internacional sobre SAF</p> | <ul style="list-style-type: none"> Resultados: diciembre 2024 Identificar regulación internacional asociada a la cadena de valor de SAF |  <p>Regulación</p> | <p>Identificar la regulación necesaria a implementar para propiciar el desarrollo adecuado de todas las actividades asociadas a la industria de SAF, considerando aspectos relativos a seguridad de las instalaciones en toda la cadena de valor, a la infraestructura aeroportuaria y a las materias primas y, asimismo, con respecto a las especificaciones de calidad del combustible.</p> |

Hoja de Ruta SAF

Próximos pasos



| Nombre | Descripción | Eje | Acción  |
|---|---|---|---|
| <p>Patrocinio de fondos para el financiamiento de proyectos de SAF</p> | <ul style="list-style-type: none"> • Acompañamiento de proyectos de I+D vinculados a SAF. • Patrocinio de proyectos y articulación con actores de la industria. <p style="text-align: right; color: #FFD700;">Desarrollo de mercado</p> |  <p>Tecnología</p> | <p>Promover la integración de las organizaciones postulantes a fondos de I+D+i con actores de la industria de los SAF para apoyar su adjudicación.</p> |
| <p>Acuerdo de colaboración Chile-Brasil</p>  | <ul style="list-style-type: none"> • Compartir mejores prácticas y experiencias regulatorias para la promoción de los SAF • Intercambiar conocimientos técnicos y científicos. • Formar al personal en materia de SAF |  <p>Formación de capacidades</p> | <p>Suscribir instrumentos entre Chile y países pioneros en el desarrollo y producción de SAF para el intercambio de experiencias y cooperación técnica.</p> |

Hoja de Ruta SAF

Oportunidades



LICITACIÓN PÚBLICA
ESTUDIO NORMATIVA INTERNACIONAL
PARA PRODUCCIÓN Y USO DE SAF

ACT SAF
HELPING COUNTRIES TAKE ACTION ON THE DEVELOPMENT
AND DEPLOYMENT OF SUSTAINABLE AVIATION FUELS

Estudio ACT-SAF OACI

Acuerdo

Patrocinio de fondos para el financiamiento de proyectos de SAF.

ACUERDO PÚBLICO-PRIVADO SAF



Thank You



Airbus ambitions

Pioneering Sustainable Aerospace

Reduce by 63% our Industrial emissions (Scope 1 & 2)*

Offer 100% SAF capability on our commercial aircraft before

2030

Reduce by 46% the CO2 emissions intensity generated by our commercial aircraft (Scope 3 - Use of Sold Products)*

Be the 1st major manufacturer to offer a Hydrogen commercial aircraft by

2035

Support the aerospace industry to reach aviation net-zero emission target by

2050

* Targets validated by the Science Based Targets initiative (SBTi)

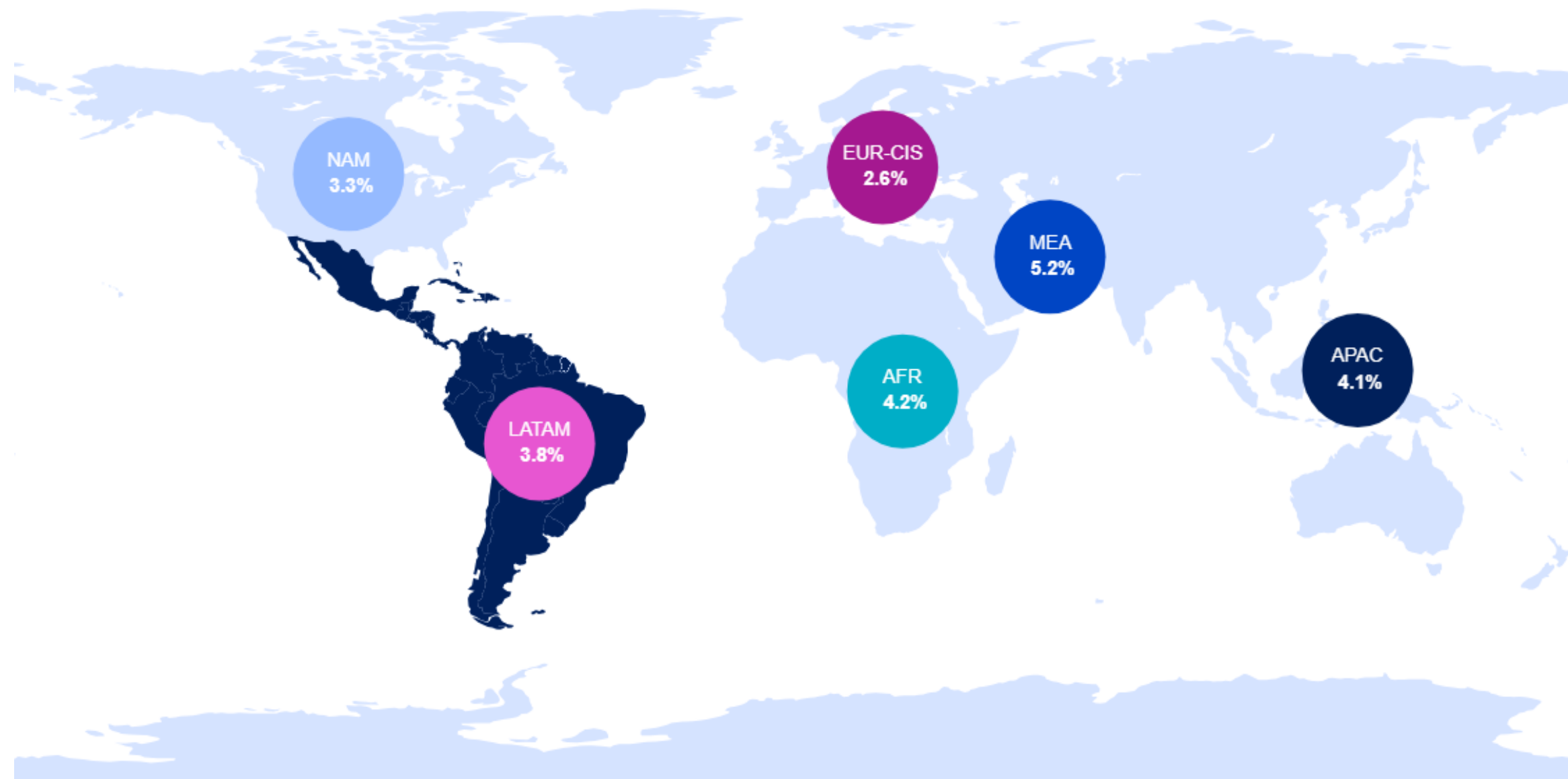
Aviation's path towards zero emissions



Origin & Destination Passenger Traffic in Latin America to increase by 2.2 over 2019-2042

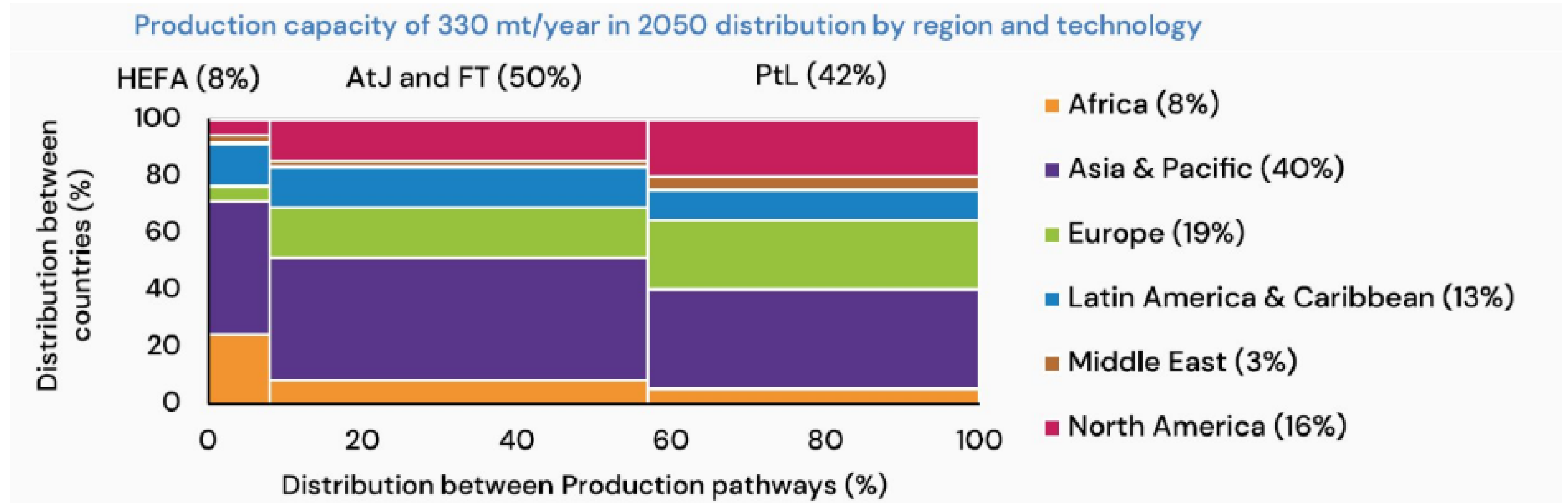
Source: Airbus GMF

Origin-Destination passenger traffic forecast from/to/within Latin America - 2019-2042 CAGR



To reach 2050 Net-Zero target, success of SAF production deployment is crucial

Almost 30% of expected production in 2050 for NAM/CAR/SAM



- Several pathways are required
- Most current announced SAF production capacities are relying on HEFA technologies
- However only 8% of forecasted need by 2050
- Alcohol-to-Jet, FT, and PtL as a key pathway for the future

ICAO 3rd Conference on Alternative Aviation Fuels (CAAF/3)

Observations

- Success demonstrating the capacity of ICAO to lead and coordinate the global decarbonisation of aviation with the support of the Member States and the whole Industry across the world.
- Clear momentum on SAF among the 193 States of ICAO - there is willingness to collectively grow SAF production and usage.
- Agreement will facilitate actions on SAF across the world and help reaching decarbonization targets (even if we still need to do a lot to accelerate the development of the global SAF market)
- Cooperation and support to developing and emerging countries is paramount in this global framework -
 - Airbus still acting as a catalyst for the development of SAF across the world, working closely with ICAO and its member States,
 - The ACT-SAF programme is fundamental to prepare investment (Finvest HUB) and production capacity through Training, Feasibility Studies, Capacity building and cooperation initiatives

**Need now for ICAO and industry to demonstrate our capacity to deploy
ACT-SAF and Finvest HUB are the main pillars**

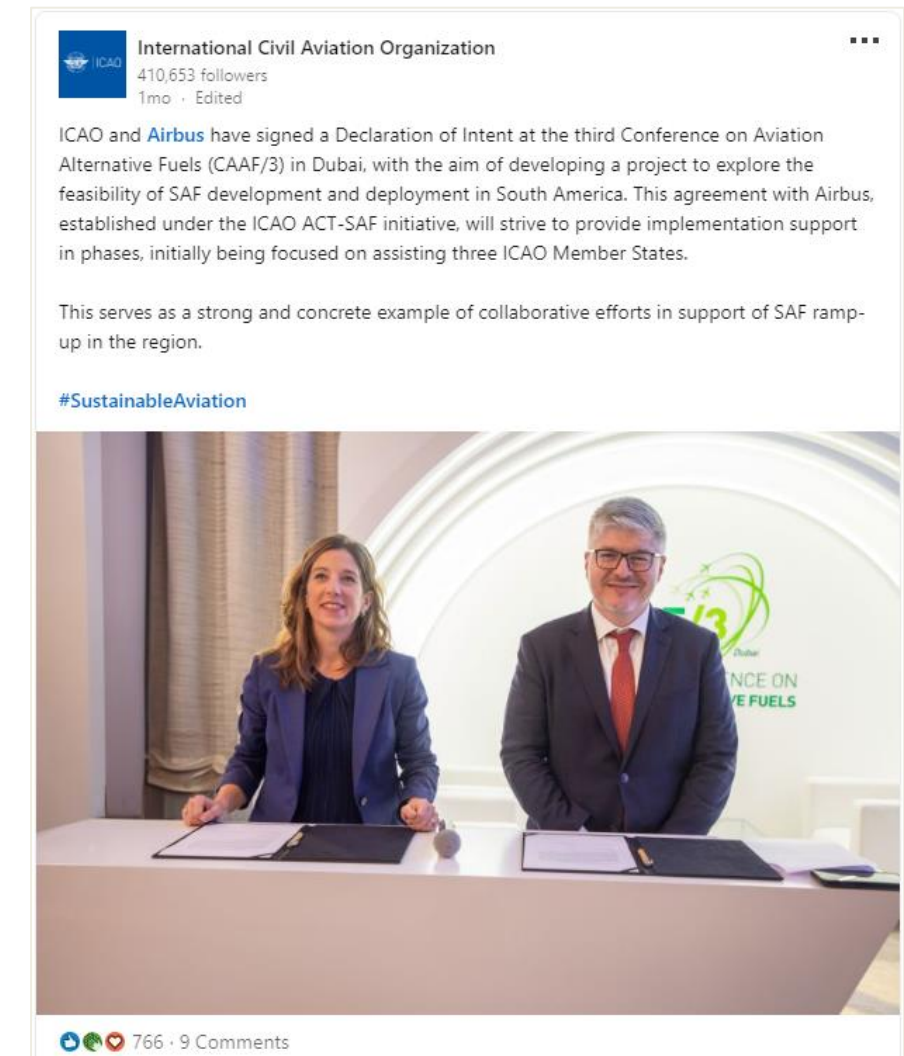
Airbus supports ICAO ACT-SAF since March 17th 2023



- **Training: Contribution to ACT-SAF Series sessions**
 - #3 - SAF production technologies and certification (“Provide participants with an understanding of the specifications of Aviation Turbine Fuel (ATF) and on the process to approve new pathways for fuel production and its use on aircraft”)
 - #9: Green Hydrogen for Aviation (“Provide participants with knowledge on Green Hydrogen for Aviation, its production and its use for SAF production processes”)

- **Feasibility Studies**
 - ACT-SAF in South America - 3 Feasibility studies targeted in 2024 - Cooperation with the ICAO SAM office
 - ACT-SAF in APAC - 1st contacts in support to Vietnam; Support to Indonesia, Philippines under investigation
 - Others to come

- **Alignment and support with EU cooperation projects:**
 - Seven SAF feasibility studies have been developed as part of the ICAO-EU assistance project "Capacity building for CO2 mitigation from international aviation"
 - Others by the EU in Africa





Airbus as a SAF catalyst in Latin America & Caribbeans



Regulation

Active member of VUELO LIMPIO, **SAF Roadmap.**

Funding external Consulting Support (Deloitte) on SAF Regulation in México

SAF Roadmap Support in **Colombia:** Risk & Opportunities assessment in cooperation with Aerocivil, Deloitte and Bogota Universities)



Demand

Ferry Flight with **SAF: 5% free neat SAF** for every new aircraft and every customer

Airbus use of SAF in own operations (11 mios liters neat SAF in 2023)



Supply, Feedstock & education

ICAO Feasibility Studies in South America

AIRBUS & LATAM studies with MIT: Chile, Brazil, Ecuador, Peru, Mexico.

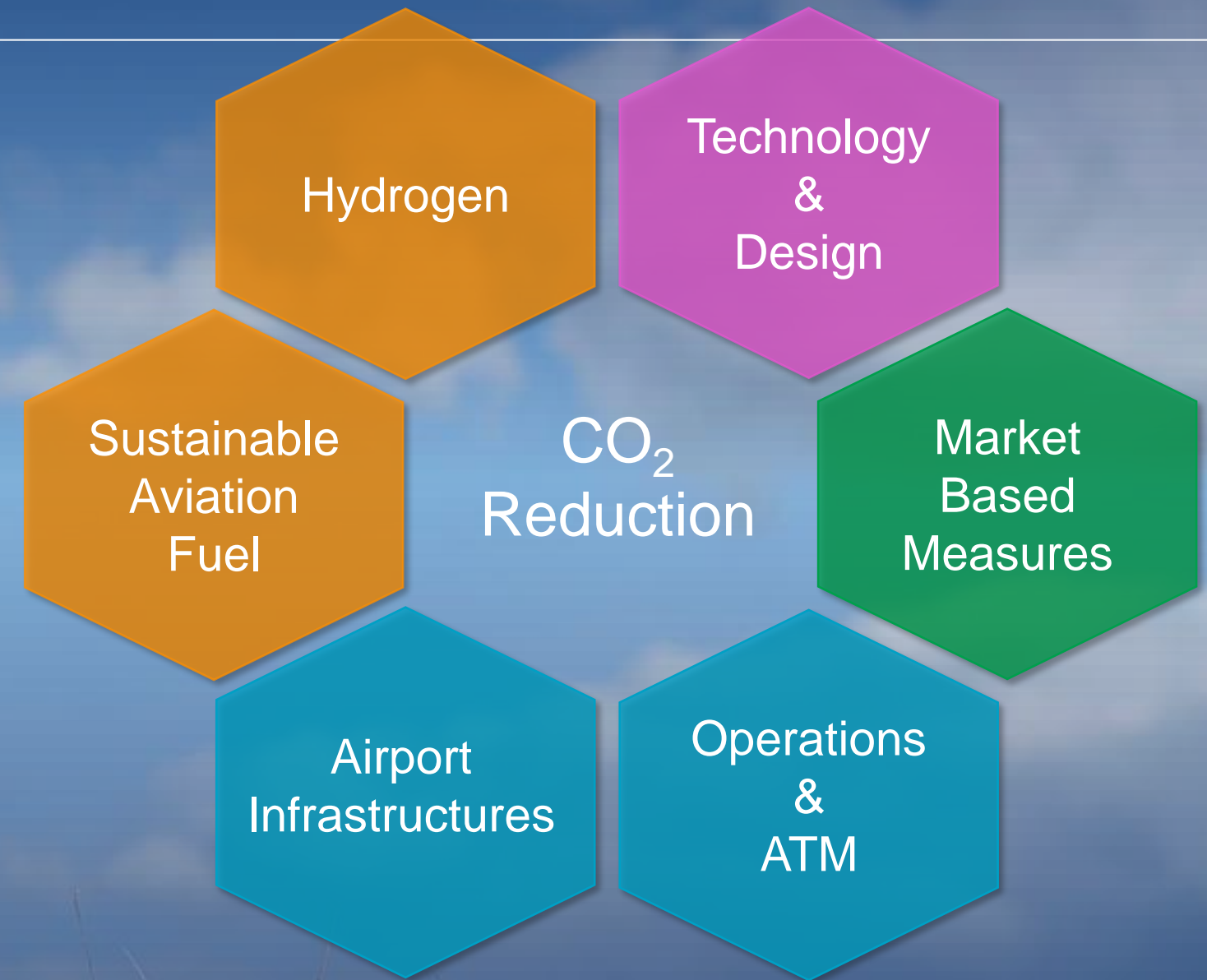
SAF Contest in México among Universities and Research Centers



Enabling factors for decarbonisation and SAF development

- The **LTAG** - (Long-Term Aspirational Goals) and the last **CAAF/3** are the global framework references for Aviation decarbonisation,
- **Regional and/or national action plans** and projects (**States Action Plans**) are essential - SAF, hydrogen and electricity are the core elements of national actions.
- **ACT-SAF (and FinvestHUB) are very good tools for Airbus to support ICAO** at regional level in supporting implementation (cooperation and partnerships), local advocacy and policies,
- **Collaboration** between industry, government, research institutions and energy sector through concrete synergies and projects **is key**,
- **Means of implementation from ICAO:** Vision, Regulatory support, Capacity building and financing options,
- The capacity of **ICAO to support SAF deployment** is one key challenge for the next Assembly (2025) and for the next cycle after 2025,
- **More and more ACT-SAF initiatives** will be launched in the coming years

Airbus leading decarbonisation



Airbus is fully engaged in

Driving the sector to Net Zero Carbon aviation

Leading the change through the aviation industry roadmap

Cooperating with our customers to meet the aviation decarbonization targets

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TRANSFORMING THE FUTURE

THE ROLE OF TECHNOLOGY LICENSORS IN AVIATION DECARBONIZATION

PANEL: FINANCING FOR AVIATION DECARBONIZATION PROJECTS

ANDRE DEFAVERI

HONEYWELL ESS – ENERGY & SUSTAINABILITY SOLUTIONS

DIRECTOR – SALES & NEW BUSINESS DEVELOPMENT LATIN AMERICA

ASUNCIÓN

PARAGUAY – AUGUST 2024

Honeywell
UOP

2024 ICAO REGIONAL SEMINAR ON ENVIRONMENT

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2050



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CORSIA



FORWARD LOOKING STATEMENTS

This presentation contains certain statements that may be deemed "forward-looking statements" within the meaning of Section 21E of the Securities Exchange Act of 1934. All statements, other than statements of historical fact, that address activities, events or developments that we or our management intends, expects, projects, believes or anticipates will or may occur in the future are forward-looking statements. Such statements are based upon certain assumptions and assessments made by our management in light of their experience and their perception of historical trends, current economic and industry conditions, expected future developments and other factors they believe to be appropriate. The forward-looking statements included in this presentation are also subject to a number of material risks and uncertainties, including but not limited to economic, competitive, governmental, technological, COVID-19 public health factors or impacts of the Russia-Ukraine conflict affecting our operations, markets, products, services and prices. Such forward-looking statements are not guarantees of future performance, and actual results, and other developments, including the potential impact of the COVID-19 pandemic, the Russia-Ukraine conflict, and business decisions may differ from those envisaged by such forward-looking statements.

Any forward-looking plans described herein are not final and may be modified or abandoned at any time. We identify the principal risks and uncertainties that affect our performance in our Form 10-K and other filings with the Securities and Exchange Commission.



HONEYWELL OVERVIEW

NASDAQ: HON | ~715 sites | ~97,000 employees | Charlotte, NC headquarters | Fortune 500 | 2023 Revenue: ~\$37 B



Our products and services are used on virtually every commercial, defense, and space aircraft. We build aircraft engines, cockpit and cabin electronics, wireless connectivity systems and mechanical components. Our hardware and software solutions create more fuel-efficient aircraft, more direct and on-time flights and safer skies.



Commercial building owners and operators depend on our operational technology hardware, software and analytics to help create safer and more efficient and productive facilities. Our solutions and services are used in more than 10 million buildings worldwide.



We help solve tough sustainability and energy transition challenges across our end markets that help reduce emissions and deliver innovative sustainable solutions while seizing new opportunities to deliver outstanding value to our clients and shareholders.



We provide solutions to support our customers to help deliver results with enhanced productivity and safety standards. Our innovation powers process solutions, asset performance management, cybersecurity, and warehouse and retail automation.

HONEYWELL CONNECTED ENTERPRISE

We empower those who make, move and operate critical resources to grow responsibly. Our flagship Honeywell Forge solutions drive business outcomes around performance, efficiency, cybersecurity and safety by uniting data across assets, people and processes. We leverage the latest technologies and persona-focused design to help uncover hidden insights, increase productivity and enhance the user experience from the shopfloor to the top floor.

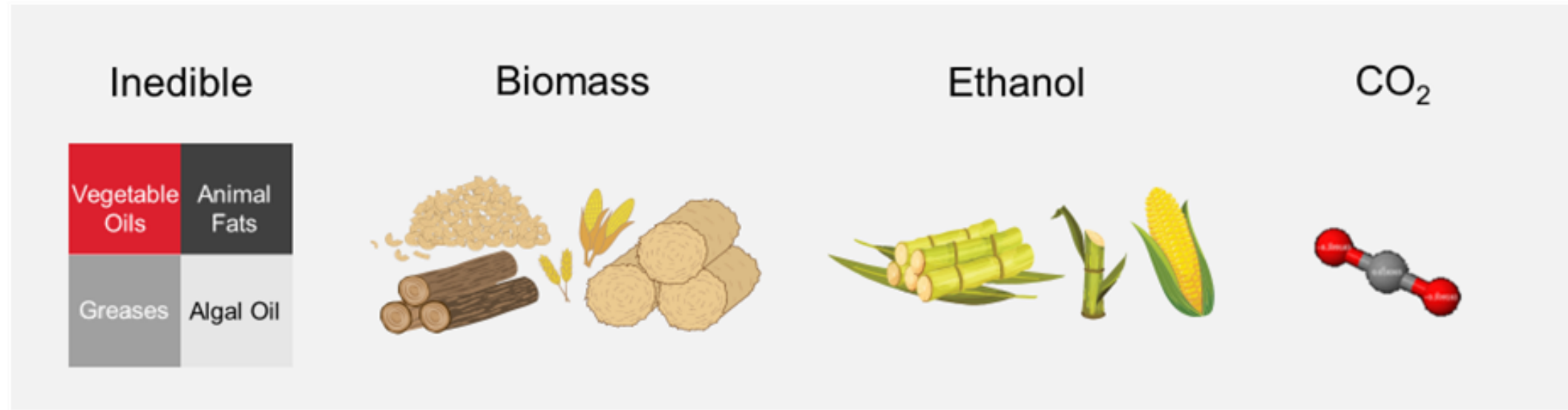
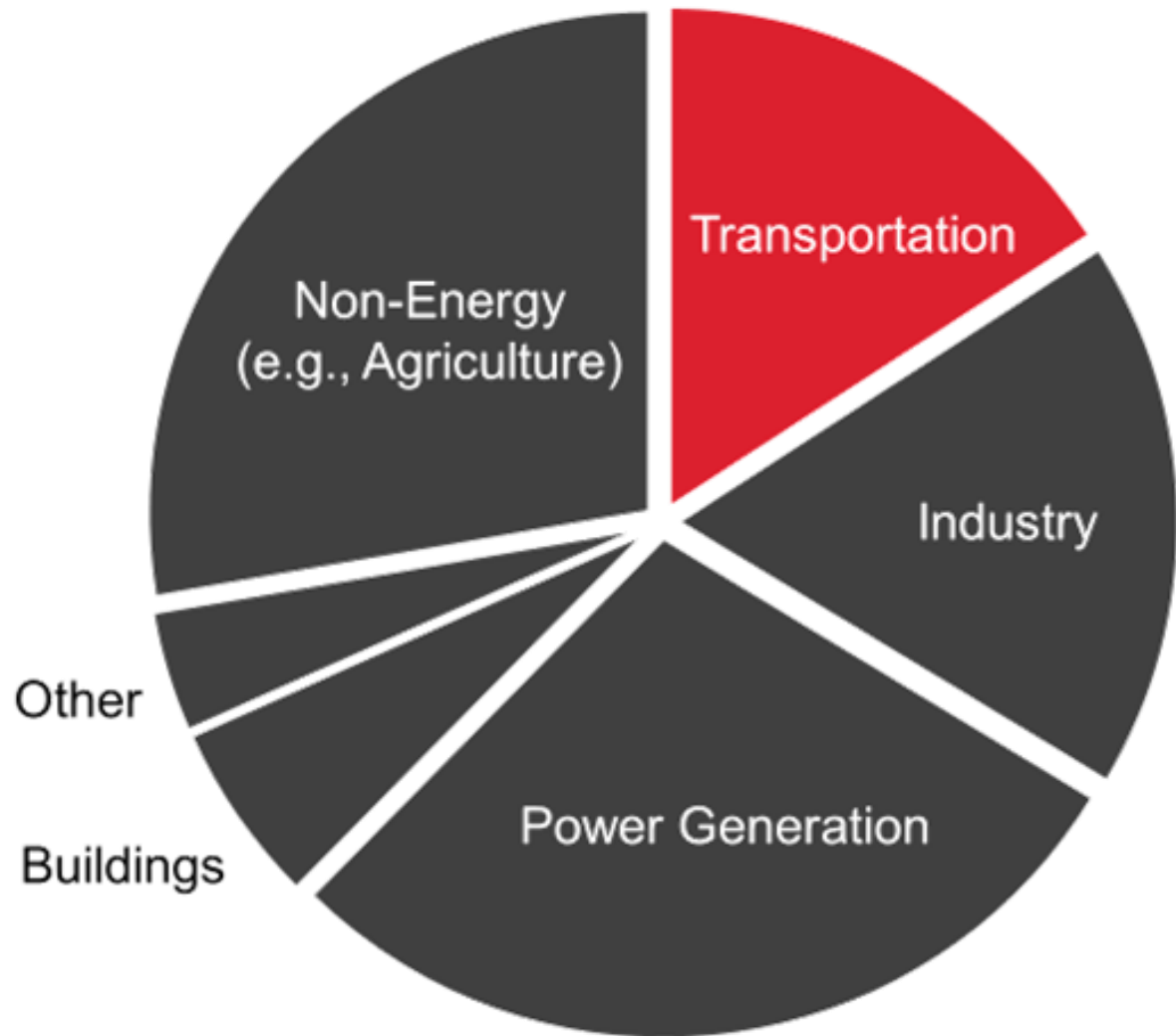
Shaping the Future Across Industries

HONEYWELL UOP IS DECARBONIZING TRANSPORTATION

THE CHALLENGE

HONEYWELL'S RESPONSE

CO₂ Share by Sector¹



- **HON Solutions:** Renewable Diesel, Sustainable Aviation Fuel (SAF), eFuels
- Up to 90% Lower GHG vs. Fossil Fuels
- Enabled by HON Digital Solutions (Experion, Unisim, APC, APM, OTS)



500k BPD Licensed; 100M tons/year CO₂ savings potential

¹Source: International Energy Agency



HIGHLIGHTING THE IMPORTANCE OF FINANCING AND INVESTMENT FOR DECARBONIZATION PROJECTS IN AVIATION

Synergies Between the Paris Agreement and CORSIA

- **Complementary Goals:** While the Paris Agreement addresses global climate goals and the reduction of greenhouse gases broadly, CORSIA specifically targets the aviation sector's contribution to these goals.
- **Sector-Specific Measures:** CORSIA represents a sector-specific initiative that complements the overarching targets of the Paris Agreement, focusing on reducing emissions in the aviation industry, one of the fastest-growing sources of greenhouse gases

The Role of Sustainable Aviation

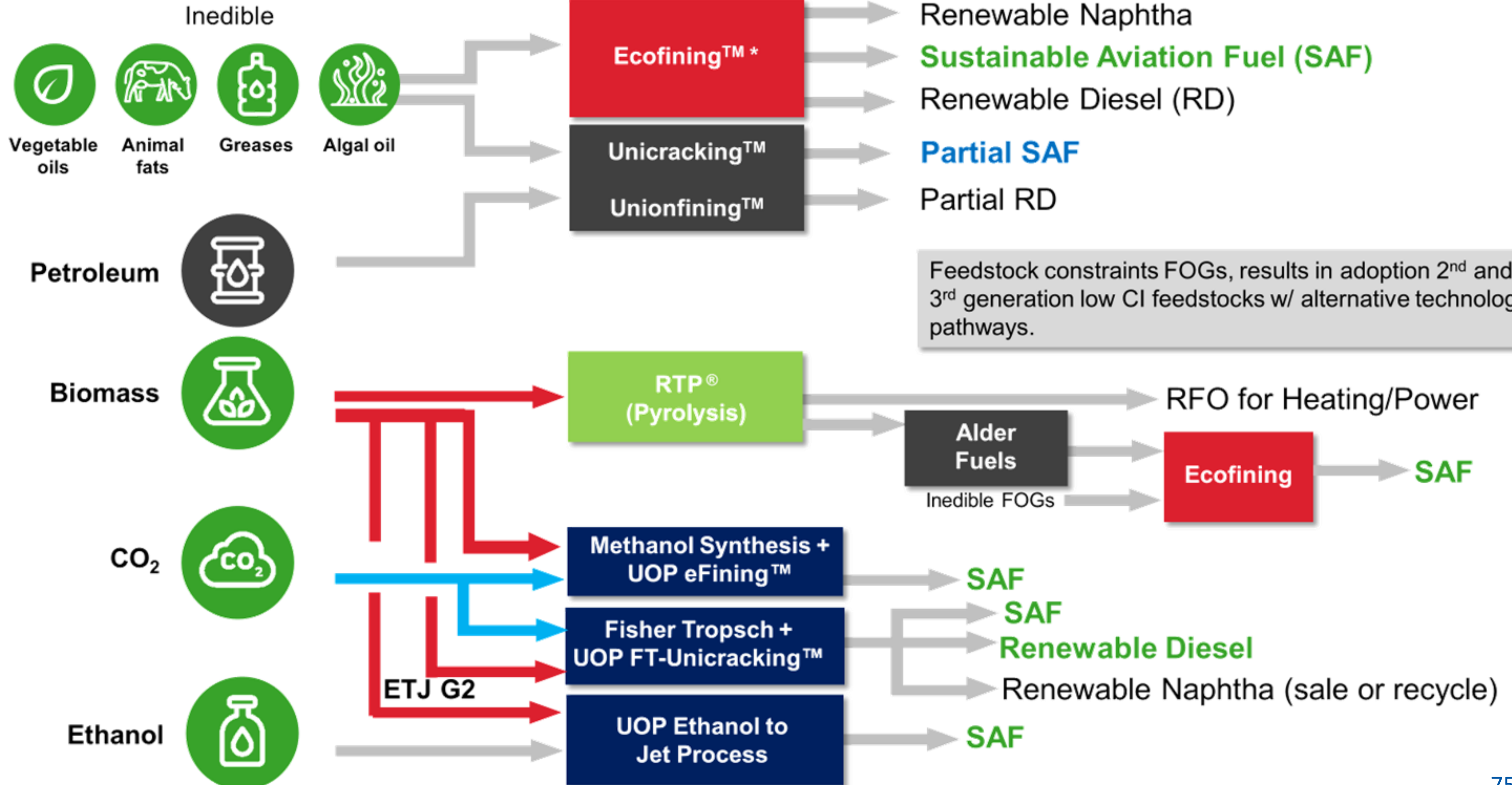
- **Key Solution:** SAF represents a crucial component of aviation's decarbonization strategy. SAF can reduce lifecycle carbon emissions by up to 80% compared to conventional jet fuels.
- **Current Limitations:** While SAF has the potential to significantly cut emissions, its production and deployment are still in early stages, largely due to high costs and limited supply.

HIGHLIGHTING THE IMPORTANCE OF FINANCING AND INVESTMENT FOR DECARBONIZATION PROJECTS IN AVIATION

Financial Challenges Faced by SAF Projects

- **High Initial Costs:** Substantial initial capital required for developing SAF production facilities and technologies.
- **Market Uncertainty:** Uncertainty in the market, including certified feedstock supply, lack of regulations/legal uncertainty, fluctuating and forecasted fuel prices, and the need for stable, long-term demand to justify investments.
- **Infrastructure Needs:** Investments to support SAF production and distribution, such as refineries and transportation systems.

HONEYWELL UOP TECHNOLOGY PATHWAYS SAF



Feedstock constraints FOGs, results in adoption 2nd and 3rd generation low CI feedstocks w/ alternative technology pathways.



* Ecofining technology produces renewable diesel, SAF, and other renewable products from biogenic feed sources. The technology was developed and commercialized jointly by UOP in collaboration with ENI

THE ROLE OF TECHNOLOGY LICENSORS

1. MAXIMIZE SAF YIELD

Optimized feedstock efficiency by achieving the highest possible SAF yield from each unit of feedstock.

2. COST-EFFECTIVE SOLUTIONS

Reduced Equipment & Capital Costs: Streamline processes to lower equipment count and capital expenses, enhancing project viability.

3. SUSTAINABLE PRODUCTION

Lower Energy & CO₂ Emissions: Ensure the entire SAF production chain is sustainable, with CO₂ emissions significantly lower than conventional fossil fuels.

4. CERTIFICATION READY

ASTM D7566 Compliance: Develop a clear path to achieve ASTM fuel certification, a crucial milestone for methanol-derived SAF projects.

5. MINIMIZE TECHNICAL RISK

High Technical Readiness: Integrate advanced technologies with proven maturity levels to minimize technical risks in CO₂ to jet fuel conversion.

OPPORTUNITIES FOR FINANCING AND INVESTMENT

1. Project Financing (Equity/Debt Financing)

- Equity investment from venture capitalists, private equity firms, or strategic investors interested in SAF.
- Bank loans, bonds, or other forms of debt instruments specifically designed for SAF projects.

2. Development Finance Institutions (DFIs)

- Investments from entities like the World Bank or regional development banks aimed at advancing SAF technology in emerging markets.

3. Corporate Partnerships

- Long-term supply agreements where airlines invest in SAF production to secure a stable fuel supply and meet their sustainability targets.

4. Tax Credits and Incentives

- Tax relief and tax exemption, or deductions for capital investments in SAF infrastructure.
- Tax credits for producing SAF, reduced fuel taxes

HONEYWELL UOP KEY MESSAGES



PROVEN TRACK RECORD OF SUCCESS OVER THE LAST 100 YEARS

- 100+ years of experience developing technologies for the world's largest energy companies
- 4,900+ patents in force, 1,400+ since 2019
- 1800 Modular engineering implementations and 300 active connected digital engagements



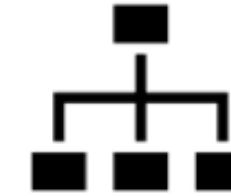
INDUSTRY LEADING COMMERCIALIZATION AND SCALE UP CAPABILITIES

- 150 pilot and semi-works plants in 8 sites globally
- 2,000 scientists and engineers on staff
- Driving sustainability solutions and decarbonization at an unprecedented scale



TECHNOLOGY PORTFOLIO THAT CAN ADDRESS ~70% OF THE WORLD'S CO₂

- Applying proven technologies, optimized for sustainability and decarbonization
- Pioneer and leading position in **Sustainable Aviation Fuel technology**
- Key technologies for both **Blue and Green Hydrogen**
- Leading supplier of both solvents and adsorbents for **CO₂ capture**



BACKED BY OUR FORTRESS BALANCE SHEET

- Honeywell financial strength
 - Fitch = A
 - Moody's = A2
 - S&P = A
- Strong Guarantees Surrounding Performance Metrics
- Warranties on both engineering and equipment supplied
- Honeywell UOP mitigates obsolescence risk

Built to address the megatrend of the energy transition

Thank You

