Coordinating research and innovation in the field of sustainable alternative fuels for aviation

Deliverable 3.7
Report on Stakeholder Workshop

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CORE-JetFuel

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Report on Stakeholder Workshop of Working Group 4 on Policies, Incentives and Regulation

SUBMITTED VERSION 1.0

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Work Package 3: International Expert and Stakeholder Exchange
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EXECUTIVE SUMMARY

On October 20th – 22nd 2014, the three European projects CORE-JetFuel, FORUM-AE and ITAKA organized the Sustainable Aviation Fuels Forum in Madrid. In context of this event CORE-JetFuel conducted its first stakeholder workshop on policies, incentives and regulation. The workshop was organized in two complementary sessions, addressing with pertinent experts policies and sustainability schemes framing alternative aviation fuels on a global as well as on a European scale.

In terms of globally harmonizing sustainability and policy frameworks for the large-scale market-uptake of alternative aviation fuels, the workshop participants identified short-term market incentives such as feed-in tariffs for the promotion and deployment of new technologies an important measure. In addition, stable policy frameworks as well as a minimum guarantee of five years for incentives are according to the workshop participants crucial for ensuring investment security. Harmonizing policies on a global scale should ensure the sustainability of biofuels by promoting good practices and focussing on land use to address issues such as food security and deforestation.

On European level, the workshop participants identified a lack of specific and coherent policies incentivizing the scale-up of alternative aviation fuel production. In addition, the level of engagement by the private aviation sector in the field of alternative fuels (as a means to achieve de-carbonization targets) needs to be known and demonstrated in order to guide the development of public policies. Seeing as the aviation sector is still using only relatively small amounts of biofuel, the CORE-JetFuel stakeholders recommended to also promote advanced technologies for so-called second and third generation biofuels in the road transport sector, thereby increasing overall production volumes (backed by binding mandates) and building synergies between the road sector and aviation.

Emphasis shall be placed on the communication with the general public and non-governmental organizations on available sustainable potentials for the production of (advanced) biofuels for transport in order to address the negative image of biomass based energy production.

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LIST OF ABBREVIATIONS

ABRETF	(Indonesia) Aviation Biofuel & Renewable Energy Task Force
AFTF	Alternative Fuels Task Force
aireg	Aviation Initiative for Renewable Energy in Germany
ANAC	Brazilian Civil Aviation National Agency
ASTM	American Society for Testing and Materials
ATAG	Air Transport Action Group
CAAFI	Commercial Aviation Alternative Fuels Initiative
CAEP	Committee on Aviation Environmental Protection
CAP	Common Agriculture Policy
C-JF	Core-JetFuel - Coordinating research and innovation in the field of sustainable alternative fuels for aviation
CO_2	Carbon Dioxide
COP 21	United Nations Climate Change Conference
DBFZ	Deutsches Biomasseforschungszentrum
DG	Directorate General
DGCA	Directorate General Of Civil Aviation, Indonesia
EC	European Commission
ENAC	Italian Civil Aviation Authority
EPA	Environmental Protection Agency
ETS	Emission Trading Scheme
EU	European Union
FAA	Federal Aviation Administrative
FAO	Food and Agriculture Organization
FT	Fischer-Tropsch
GHG	Greenhouse Gas
HEFA	Hydro-processed Esters and Fatty Acids
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IGAC	Indonesia Green Aviation Conference
IINAS	International Institute for Sustainability Analysis and Strategy
ILUC	Indirect Land Use Change
INRA	Insitute Nationale de la Recherche Agronomique
IPCC	Intergovernmental Panel on Climate Change
ISAFF	Italian Sustainable Aviation Fuel Forum
ISCC	International Sustainability and Carbon Certification
ISEAL	International Social and Environmental Accreditation and Labelling

ISEAS	Integrated Seawater Energy and Agriculture System
ITAKA	Initiative towards Sustainable Kerosene for Aviation
LCA	Life Cycle Assessment
MIT	Massachusetts Institute of Technology
MSW	Municipal Solid Waste
NISA	Nordic Initiative for Sustainable Aviation
PNPB	Brazilian National Biodiesel Program
R&D	Research and Development
RED	Renewable Energy Directive
RFS	Renewable Fuel Standard
RIN	Renewable Identification Number
RSB	Roundtable on Sustainable Biomaterials
SUSTAF	Sustainable Alternative Fuels
WEC	World Energy Council
WWF	World Wide Fund for Nature

Background - The CORE-JetFuel Project

For a number of ecologic and economic reasons, the aviation industry is highly interested in alternative fuels. Highly ambitious goals for the reduction of the sector's overall greenhouse gas emissions set from industry and politics imply sustainable alternative fuels as an important contribution. To meet the high expectations research and innovation efforts are required in order to develop pathways for an economically feasible large-scale production of such fuels for aviation.

The transformation of its energy base from fossil fuels to a secure supply of renewable, climate-friendly, sustainable and sufficiently scalable alternative fuels represents a tremendous challenge for aviation. Many different types of renewable feedstock, most prominent biogenic materials (biomass), and various kinds of conversion technologies can be utilised for the production of alternative jet fuel.

Objectives

The CORE-JetFuel project supports the European Commission in its dynamic and informed implementation of research and innovation projects in the field of sustainable alternative fuels for aviation. It links initiatives and projects at the EU and Member State level, serving as a focal point in this area to all public and private stakeholders. CORE-JetFuel addresses competent authorities, research institutions, feedstock and fuel producers, distributors, aircraft and engine manufacturers, airlines and NGOs. The project is aimed to set up a European network of excellence for alternative fuels in aviation that brings together technical expertise from all across this complex thematic field and helps to coordinate R&D as well as implementation efforts.

More information can be found on the CORE-JetFuel official website: www.core-jetfuel.eu

Stakeholder involvement

CORE-JetFuel will ensure cooperation with other European, international and national initiatives and with the key stakeholders in the field. The expected benefits are enhanced knowledge of

decision makers, support for maintaining coherent research policies and the promotion of a better understanding of future investments in aviation fuel research and innovation.

In order to ensure efficient involvement of international experts and stakeholders in the coordination of research and innovation throughout the duration of the project, four stakeholder working groups are established on the following topics.

- WG1: Feedstock and sustainability
- WG2: Radical concepts and conversion technologies
- WG3: Technical compatibility, certification and deployment
- WG4: Policies, incentives and regulation

Workshop Organization

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Introduction

The Sustainable Aviation Fuels Forum in Madrid on 20th – 22nd October 2014 was jointly organised by the projects CORE-JetFuel, FORUM-AE and ITAKA. This Sustainable Aviation Fuels Forum focused on recent progress and important steps forward in the field of sustainable fuels for aviation.

The event brought together stakeholders to share experiences and views, to exchange best practices, to evaluate emerging issues and to jointly elaborate recommendations towards the successful future development of sustainable aviation fuels. By emphasizing the cooperation between experts and relevant players in the field of sustainable alternative fuels for aviation, the workshop set out to implement long-lasting, fruitful synergies and a vivid exchange of knowledge between the participants.

The Stakeholder Workshop of CORE-JetFuel Working Group 4 on Policies, Incentives and Regulation took place in context of the Sustainable Aviation Fuels Forum on October 20th 2014. The workshop addressed policies on alternative fuels for aviation and was organized in two complementary sessions. The CORE-JetFuel Consortium chose panel discussions as a format for its first stakeholder workshop to make it more interactive for the audience on the one hand, and on the other hand to retrieve more knowledge from the experts participating in the workshop.

In order to facilitate a targeted discussion with maximum thematic output for the CORE-JetFuel project, the participants of the panel discussion on policies, incentives and regulation have been provided with guiding questions in advance to the Sustainable Aviation Fuels Forum. The panel questions as well as additional supporting material can be found in the appendix.

Policies on Alternative Fuels for Aviation – CORE-JetFuel Stakeholder Workshop

1 Panel Discussion 1: Global Harmonization of Sustainability and Policy Frameworks

This panel discussion aimed to provide an overview on global actions to promote sustainable alternative fuels for aviation and to discuss existing related policy options, incentives and regulation. Focus was placed on steps taken for global harmonization and future needs on this regard.

Figure 1: Panelists (f.l.t.r.): S. Senobua, U. Fritsche, P. Novelli, R. Baltause, O. Dubois, A. Filizola, J.Hileman

1.1 Moderation:

César Velarde, ICAO Technical Cooperation Bureau, DGCA Indonesia

1.2 Panellists:

- Philippe Novelli, Environmental Branch – International Civil Aviation Organization (ICAO)
- Ruta Baltause, Policy Officer, European Commission - DG ENER, Unit C1 – Renewables and CCS Policy
- Olivier Dubois, Senior Natural Resources Officer & Leader Energy Team. Food and Agriculture Organization (FAO) of the United Nations
- Uwe Fritsche, IINAS, Germany
- Jim Hileman, Chief Scientist and Technical Advisor for Environment and Energy. Federal Aviation Administration – United States of America
- Alexandre Filizola, Regulation Specialist, Brazilian Civil Aviation National Agency (ANAC)
- Sayuta Senobua, Directorate General Of Civil Aviation (DGCA) – Indonesia

From the US perspective **Jim Hileman, Federal Aviation Administration**, underlined the importance of alternative aviation fuels to contribute to GHG emission reduction targets and to improve overall sustainability of the aviation sector, as well as to enhance energy security and

rural economic development. Focus is placed on the production of drop-in fuels and operational safety through the establishment of public-private partnerships and knowledge centres. Currently, the high costs of alternative aviation fuels are the main limiting factor towards large-scale deployment. Further research efforts are thus urgently needed to identify main cost drivers and to find ways to reduce costs of alternative aviation fuels below 4 USD per gallon[1]. Prices will go down as more facilities producing alternative aviation fuels come online due to economies of scale.

In the US, the Renewable Fuel Standard (RFS) program, created under the Energy Policy Act (EPAct) of 2005, established a renewable fuel volume mandate including separate volume requirements for advanced biofuels. Incentives for renewable fuels under the RSF are established through the Renewable Identification Number (RIN) system. Today, an alternative aviation fuel production facility for HEFA (Hydro-processed Esters and Fatty Acids) is in operation in Louisiana and further facilities are under construction using Municipal Solid Waste (MSW) and forest residues as feedstock. Bio-jet fuels from these facilities will cost less than 3.50 US$/gallon and will provide 50 – 80% GHG emission reduction compared to fossil jet fuels.

Alexandre Filizola, Brazilian Civil Aviation National Agency, reported that the Brazilian ethanol programme was launched as early as 1975 in response to the first oil crisis in order to ensure supply security of transport fuels. The role of the Government within the programme was to ensure demand through guaranteed off-take of the produced ethanol assuring investment security for producers as well as fuel availability for end consumers. In addition, in 2005 the Brazilian National Biodiesel Program (PNPB) was launched mandating B2 (2% biodiesel blended in diesel oil) from 2008. Currently, B7 blending is used in the Brazilian road transport sector.
Until today, Brazil does not have a specific policy for alternative aviation fuels, however initiatives exist on state level. As member of the International Civil Aviation Organization (ICAO), Brazil supports its goal of carbon-neutral growth from 2020 as well as the development of harmonised standards for monitoring, reporting and verifying emissions from aviation.

Olivier Dubois, FAO, emphasised the importance of bioenergy policies to embrace complexities of bioenergy value chains and avoid simplifications. Policy development needs to be based on existing good practices (e.g. multi cropping and crop rotation systems) and duly take into account the wealth of different site specific framework conditions which are not appropriately covered by modelling exercises (such as modelling of indirect land use changes).

With respect to (mandatory) targets for alternative fuels, Mr Dubois promoted the implementation of moderate targets which may later be increased in case of over-fulfilment. Sustainability certification shall not exclusively rely on compliance with a set of criteria, but also acknowledge performance evolution and progress achieved towards the long-term sustainability goal.

The EU biofuel policy development towards 2020 and beyond was presented by **Ruta Baltause, European Commission - DG ENER**. Reflecting the Council's position in June 2014, the revision of the biofuel legislation ("ILUC proposal") is expected to place a 7% cap on food-crop based biofuels, to introduce a non-legally binding sub-target of 0.5% advanced biofuels, and to include multiple counting schemes for cellulosic materials and electricity use in transport. Further

[1] Fossil Jet Fuel: 2,09 US$/gal. (Index Mundi, Dec. 2014: http://www.indexmundi.com/commodities/?commodity=jet-fuel)

initiatives promoting advanced alternative fuels on EU level include research and innovation funding under the programme Horizon 2020 and the industry led Biofuel Flightpath initiative.
With respect to the 2030 energy and climate policy, transport is fully integrated in the 2030 GHG reduction (40%) and RES (27%) targets, however specific targets no longer exist for the transport sector. Food-based biofuels should not receive public support after 2020 and focus shall be placed on improving the efficiency of the transport system and further development and deployment of electric vehicles and advanced biofuels.

Ms Baltause acknowledged that incentives are needed for the promotion of advanced biofuels. However, the implementation of effective and appropriate incentives is a difficult task and the proposed multiple counting schemes as well as the inclusion of aviation in the Emission Trading Scheme (ETS) may not be sufficient to trigger large-scale deployment.

The International Civil Aviation Organization is a specialized agency of the United Nations engaged in the development of policies and standards for the aviation sector. **Philippe Novelli, ICAO Environmental Branch**, highlighted the importance of alternative fuels within ICAO's goal to reduce the impact of aviation on climate.

Alternative aviation fuels have become a globally-discussed topic starting with the 2009 ICAO Conference on Aviation and Alternative Fuels in Rio de Janeiro. In 2012, the SUSTAF (Sustainable Alternative Fuels) Expert Group was created to develop recommendations relating to on-going challenges in the development and deployment of sustainable alternative fuels for aviation. Furthermore, in 2013 the Alternative Fuels Task Force (AFTF) was formed within the ICAO Committee on Aviation Environmental Protection (CAEP) with the main objective to evaluate the range of potential GHG emission reductions from the use of alternative fuels in aviation to 2050 and to develop guidelines for the global harmonization of Life Cycle Assessment (LCA) methodologies. Finally, ICAO is engaged in the establishment of a database documenting the status quo and future perspectives of production pathways for alternative aviation fuels for which cooperation between ICAO and the CORE-JetFuel project is considered beneficial.

Uwe Fritsche, IINAS, emphasized the competition for biomass raw material among a variety of different sectors (material use, heating and cooling, electricity, traditional use of wood fuels in developing countries). Large scale deployment of alternative biomass-based fuels for aviation is only possible if the demand for biomass is reduced in other sectors. Robust policy guidance and coherence among policies in different sectors is therefore needed to prioritise biomass use.
Furthermore, sustainability does not only address greenhouse gas emissions. Globally harmonised key principles for sustainability, including social and biodiversity aspects, need to be agreed upon leading to the identification of a sustainable potential of biomass feedstock. Such sustainability safeguards need to be established to help avoid unsustainable practices for the production of biomass.

Sayuta Senobua, Directorate General Of Civil Aviation (DGCA), presented the aviation biofuel programme in Indonesia. In 2012, a national action plan for aviation biofuel and renewable energy implementation was launched with the objective to develop policies and regulations, to create human resources and to introduce a 2% use of biofuels in the aviation sector in 2016. The Indonesia Aviation Biofuel & Renewable Energy Task Force (ABRETF) was established in 2014 and up-coming initiatives include a flight from Seattle to Jakarta with a 5-10% biofuels blend in May 2015 as well as the organization of the 2nd Indonesia Green Aviation Conference (IGAC) in July 2015.

Biofuels for the non-binding 2% blending target shall be produced from palm and coconut feedstock based on voluntary agreement with stakeholders. Currently, the construction of a bio-refinery in Indonesia is not foreseen.

1.3 Identified Issues and Results

César Velarde, ICAO Technical Cooperation Bureau, DGCA Indonesia, launched the plenary discussion with the statement that although sustainable alternative fuels for aviation have already demonstrated their technical feasibility and many global airlines have flown using alternative fuels, until today industrial-scale availability and economic competitiveness have not yet become a reality.

Within the CORE-JetFuel Working Group on Policies and Incentives, the lack of specific and coherent policies incentivizing the scale-up of alternative aviation fuel production, has been identified as one of the main barriers hindering the large-scale market up-take of alternative aviation fuels.

Figure 2: Moderator C. Velarde; Panelists: S. Senobua, U. Fritsche, P. Novelli

The following contributions from panellists and the forum audience are highlighted with respect to ***options for suitable policies and incentives for large-scale market up-take of alternative aviation fuels***.

- ***Short-term market incentives*** need to be established to promote deployment of new technologies. Such incentives need to ***create business cases for the private sector*** and facilitate technological learning curves leading to significant cost reductions. However, market incentives need to be reduced and phased out over time in order not to lead to permanent market distortions. A good example is provided by the electricity feed-in tariff system, whereas often quota systems are not successfully promoting market deployment.

- ***Stable policy frameworks and a minimum guarantee of 5 years for incentives*** are crucial for ensuring investment security. In particular, support is needed for first-of-a-kind facilities to reduce investment risk. Such support may involve the establishment of public-private partnerships.

- ***Off-take agreements at minimum selling prices for a guaranteed period of time (5-10 years)*** are important to reduce private sector risks.

- Policies need to ***promote good practices and acknowledge performance and progress achieved***. The use of flexible feedstock crops for the production of food and fuels shall be promoted.

- Before establishing mandatory targets for biomass-based alternative fuels it is recommended to ***first assess the sustainable potential*** of biomass feedstock.

- Policies ensuring sustainability of biofuels shall ***focus on land use*** in order to address the challenges such as food security, deforestation and land grabbing. Feedstock not involving land use shall be promoted.

- Due to the international nature of the aviation sector ***harmonization*** is urgently needed with respect to the accounting of benefits of alternative fuels towards GHG emission reduction targets. Existing incentives in the road transport sector need to be expanded towards the aviation sector.

- Advanced biofuel technologies may first be developed to serve the road transport sector due to its larger fuel volumes. Advanced biofuel pathways facilitating reduction of GHG emissions as well as overall sustainability at affordable costs still need to be demonstrated.

- ***Use of degraded land*** (abundant in South-East European regions) for the production of biofuels faces the barriers of lack of clear definitions of degraded, marginal, and abandoned land as well as lack of economic viability as investors will favour agricultural land for feedstock production.

2 Panel Discussion 2: The European Policy Framework

This panel discussion aimed to provide an overview on the current and future European policy framework for alternative aviation fuels as well as existing national initiatives on Member State level (aireg, ISAFF, NISA, Bioqueroseno).

Figure 3: Panellists (f.l.t.r.): A. Zschocke, P. Verhoef, D. Chiaramonti, M. Porsgaard, I. Gomez

2.1 Moderation:

Rainer Janssen, WIP Renewable Energies, Germany

2.2 Panelists:

- Paul Verhoef, Head of Unit - New and Renewable Energy Sources, European Commission - DG RTD
- Alexander Zschocke, Lufthansa AG - Aviation Initiative for Renewable Energy in Germany (aireg)
- David Chiaramonti, President of the RE-CORD Consortium – Italian Sustainable Aviation Fuel Forum (ISAFF)
- Martin Porsgaard, Nordic Initiative for Sustainable Aviation (NISA)
- Inmaculada Gomez, SENASA – Bioqueroseno, Spain

The panel discussion was launched by **Rainer Janssen, WIP Renewable Energies**, with an invitation to panellists to briefly present their national initiatives on alternative aviation fuels.
Alexander Zschocke, Lufthansa AG, presented the German national initiative ***aireg (Aviation Initiative for Renewable Energy in Germany)***. aireg was founded in 2011 as first such initiative in Europe, second only to the Commercial Aviation Alternative Fuels Initiative (CAAFI) in the US.

On operational level aireg members from air carriers, airports, research facilities as well as the aviation industry are organized in working groups on provision of feedstock, technologies for fuel production, fuel utilization, quality and certification, and sustainability. The aim of the aireg initiative is to support the development and introduction of regenerative fuels for aviation in Germany (with an indicative target of 10% alternative aviation fuels by 2025) as well as provide information about the demand, origin, availability and use of these regenerative fuels.

The ***Italian Sustainable Aviation Fuel Forum (ISAFF)*** was represented by **David Chiaramonti, RE-CORD Consortium**. ISAFF was established in June 2013 through cooperation between ENAC, the Italian Civil Aviation Authority and WEC Italy, the Italian Committee of the World Energy Council. The forum includes Italian and international members from airlines, industry and governmental institutions as well as public and private research organizations.

ISAFF acts as a platform for collecting, exchanging and discussing relevant information related to energy and sustainability in aviation and as a focal point for projects and initiatives in the area of alternative aviation fuels. The first annual ISAFF workshop is organised in Rome in November 2014.

The ***Nordic Initiative for Sustainable Aviation (NISA)*** presented by **Martin Porsgaard, NISA**, was launched in 2013 by Nordic airports, airlines and their industry federations, and aviation authorities. The initiative is supported by aircraft manufacturers Airbus and Boeing as well as IATA (International Air Transport Association).

The goal of NISA is to form a Nordic cluster network which promotes the framework and conditions for access to new fuels and also contributes to innovation and new green jobs,

attracting solid investments and contributing to the region's position as a leader in global green growth. NISA will thus focus on bringing together stakeholders throughout the supply chain to find the best and most energy efficient solutions as well as at the same time put pressure on policy makers to ensure that aviation secures its share of sustainable fuels.

Inmaculada Gomez, SENASA, presented the ***Spanish Initiative for the Production and Consumption of Bio-kerosene for Aviation (Bioqueroseno)*** as a national program, led by the Spanish government involving actors from the full value chain in a public-private partnership. Bioqueroseno was initiated in 2011 following a feasibility study indicating large potential for alternative aviation fuel production and use in Spain.

The objective of Bioqueroseno is to promote the development of a sustainable bio-kerosene industry in Spain through the implementation of the entire value chain, using second generation sustainable crops as feedstock, giving priority to raw materials that minimize environmental impact, land use changes and the competition with food production markets. Furthermore, the initiative aims at contributing to the production targets of the EU Flightpath (i.e. 2 million tonnes by 2020).

Paul Verhoef, European Commission - DG RTD, highlighted that the European Flightpath (launched in 2011) has been a political initiative under Energy Commissioner Oettinger with the objective of bringing together high (CEO) level representative from industry stakeholders in order to move forward the deployment of alternative aviation fuels. Thereby, the main interest of airlines is the reduction of alternative fuel cost whereas fuel producers aim at securing markets (e.g. off-take agreements) for their products. However, after three years only limited progress has been achieved mainly due to regulatory uncertainties, the ILUC debate, and hesitance from the financing sector.

With the upcoming 2015 United Nations Climate Change Conference (COP 21) in Paris, the recent report of the Intergovernmental Panel on Climate Change (IPCC), the EU 2030 Climate and Energy Package as well as the establishment of the new Commission, it remains to be seen how alternative aviation fuels will be integrated in broader energy and climate policies on European and global level. Nevertheless, truly high (CEO) level initiatives involving industry stakeholders engaged in alternative aviation fuels production and use will be needed for de-risking value chains leading to large scale deployment of alternative aviation fuels. Specifically, farmers will need to be motivated to grow or provide feedstock at cost levels facilitating the production of reasonably competitive alternative fuels.

2.3 Identified Issues and Results

Rainer Janssen, WIP Renewable Energies, launched the plenary discussion with the statement that the objectives of the European Advanced Biofuels Flight Path initiative, namely to achieve an annual production of two million tonnes of sustainably produced biofuel for aviation by 2020, seem to be very difficult to realize.

Figure 4: Moderator R. Janssen

The following contributions from panellists and the forum audience are highlighted addressing ***initiatives and specific measures to be implemented in order to move towards large scale deployment of alternative aviation fuels in Europe***.

- Until today, there is a ***lack of specific and coherent policies incentivising the scale-up of alternative aviation fuel production***. The aviation sector has not been strongly involved in the establishment of the Renewable Energy Directive (RED) and its alternative fuel target. Aviation fuels have not been specifically addressed in the RED, however they may be counted towards the fulfilment of targets reported by Member States.

- Based on the de-carbonisation goals of the aviation sector, the EU Flightpath initiative and existing national initiatives on alternative aviation fuels, policy options need to be discussed among representatives from the private and public (EU and Member State level) sector, including ***cost-benefit analysis of different policy options***.

- The ***level of engagement by the private aviation sector*** in the field of alternative fuels (as means to achieve de-carbonisation targets) needs to be known and demonstrated in order to guide the development of public policies.

- The establishment of a ***high (CEO) level initiative led by industry stakeholders*** on the integration of alternative aviation fuels in the aviation sector is needed. Thereby, it may be necessary to discuss a revision of the target set by the EU Flightpath in the light of current energy and climate policies.

- Due to the relatively small fuel volumes used in the aviation sector it is recommended to also ***promote advanced technologies for second and third generation biofuels in the road transport sector***. Overall production volumes need to be increased in order to achieve significant cost reductions. Synergies exist for the development of alternative fuels for the road and aviation sector and the percentage of alternative fuels available for use in the aviation sector may then be a matter of political prioritization.

- The example of advanced biofuels in the road transport sector, with recent agreements to implement commercial facilities for the production of lignocellulosic ethanol, shows that targets can be achieved with a ***clear commitment of industry*** in place.

- ***Mandates for advanced biofuels*** are seen as effective measure to scale up production. On 10 October 2014 the ***Italian Government has issued a Decree including a 0.6-1% binding mandate for advanced biofuels*** (on energy basis; with double counting), for the first time in Europe creating a dedicated market for advanced biofuels. This Decree also provides a clear definition of “advanced biofuels”.

- Trustworthy ***data on the sustainable potential of biomass in Europe*** is urgently needed to discuss (conflicting) use options in different sectors. The EU Joint Research Centre (JRC) will perform a long-term study on biomass availability in 2015.

- ***Ensuring sustainability to the highest standards*** is crucial for the deployment of alternative fuels in the aviation sector. However, production of fuels shall be possible with food-based as well as non-food feedstock as sustainability depends on management practices of specific value chains rather than on feedstock choice in general.

- ***Increased RTD on business cases for full value chains*** of alternative aviation fuels is needed in order to achieve cost reduction through learning curves.

- Emphasis shall be placed on the ***communication with the general public and NGOs*** on available sustainable potentials for the production of (advanced) biofuels for transport in order to address the negative image of biomass based energy production.

3 CORE-JetFuel Consortium

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4 Appendix

4.1 Topics and Questions Panel Discussion 1

Panel Discussion on "Global Harmonization on Sustainability and Policy Frameworks"

Timing: Monday, 20 October 2014, 09:30 – 10:40

Moderation:

César Velarde, ICAO Technical Cooperation Bureau, DGCA Indonesia

Panellists:

- ✓ Philippe Novelli, Environmental Branch – International Civil Aviation Organization (ICAO)
- ✓ Ruta Baltause, Policy Officer, European Commission - DG ENER, Unit C1 – Renewables and CCS Policy
- ✓ Olivier Dubois, Senior Natural Resources Officer & Leader Energy Team. Food and Agriculture Organization (FAO) of the United Nations
- ✓ Uwe Fritsche, IINAS, Germany
- ✓ Jim Hileman, Chief Scientist and Technical Advisor for Environment and Energy. Federal Aviation Administration – United States of America
- ✓ Alexandre Filizola, Regulation Specialist, Brazilian Civil Aviation National Agency (ANAC)
- ✓ Yusfandri Gona, Chairman Of Aviation Biofuel & Renewable Energy Task Force, Directorate General Of Civil Aviation – Indonesia

Aims and Objectives

This panel discussion aims to provide an overview on global actions to promote sustainable alternative fuels for aviation and discuss on existing related policy options, incentives and regulation. The focus will also be put on steps taken for global harmonization and future needs on this regard.

Structure and topics

1) ***Brief introduction of global actions on alternative aviation fuels (09:30 – 09:50)***

The panel includes representatives from several countries/organizations who have taken actions on alternative aviation fuels. After a short introduction by the moderator, ***each panelist is invited to briefly present and overview of the actions taken in their country or organization (with special focus on policies and incentives) in about 3 min.***

2) ***Global Harmonization on Sustainability and Policy Frameworks (09:50 – 10:20)***

Although Sustainable Alternative Fuels for Aviation have already demonstrate its technical feasibility and many global airlines have flown using them, today its industrial-scale availability and economical competitiveness has not yet become a reality.

Within a CORE-JetFuel Working Group on Policies and Incentives, the lack of specific and coherent policies incentivizing the scale-up of alternative aviation fuel production, has been identified as one of the main barriers hindering the large-scale market up-take of alternative aviation fuels.

The panellists are invited to share their views on options for suitable policies and incentives for large-scale market up-take of alternative aviation fuels.

Options for incentives might include:

- Double and multiple counting
- Voluntary and mandatory targets
- Systems such as the US Renewable Identification Number (RIN) system

Being aviation a global industry to which global policies shall be applied, the panelists are also invited to provide visions on which are the risks of establishing non-standardized policies and which actions might facilitate global harmonization of such policies.

Some questions to facilitate the debate might be:

- Which may be the most suitable policy incentives to promote sustainable fuels for aviation?
- Can some of those policies be promoted and/or applied globally?
- Shall sustainability criteria be globally harmonized?
- How can CORE-JetFuel and the EU facilitate global harmonization?

Each panellist will be asked for interventions.

3) Plenary discussion (10:20 – 10:30)

Participants of the Sustainable Aviation Fuels Forum are invited to ask questions to the panelists and/or express their view on the topics addressed in the panel.

4) Concluding panel discussion – role of CORE-JetFuel (10:30 – 10:40)

Each panellist is invited to present concluding remarks in order to provide guidance on the way forward within the project CORE-JetFuel.

We thank all panellists for their contribution to the Sustainable Aviation Fuels Forum in Madrid!!

4.2 Topics and Questions Panel Discussion 2

Panel Discussion on "The European Policy Framework"

Timing: Monday, 20 October 2014, 11:10 – 12:30

Moderation:

Rainer Janssen, WIP Renewable Energies, Germany

Panellists:

Paul Verhoef, Head of Unit - New and Renewable Energy Sources, European Commission - DG RTD

Alexander Zschocke, Lufthansa AG - Aviation Initiative for Renewable Energy in Germany (aireg)

David Chiaramonti, President of the RE-CORD Consortium – Italian Sustainable Aviation Fuel Forum (ISAFF)

Representative of French Initiative for Future Aeronautical Fuels

Martin Porsgaard, Nordic Initiative for Sustainable Aviation (NISA)

Inmaculada Gomez, SENASA – Bioqueroseno, Spain

Aims and Objectives

This panel discussion aims to build upon and follow-up on the first telephone conference of CORE-JetFuel Stakeholder Working Group 4 on Policies, incentives and regulation on 16 December 2013. Please, find attached the minutes of this CORE-JetFuel telephone conference.

Structure and topics

5) ***Brief introduction of national and EC initiatives on alternative aviation fuels (11:10 – 11:30)***

The panel includes representatives from the European Commission and of several national initiatives on alternative aviation fuels (aireg, ISAFF, Biofuel Initiative France, NISA, Bioqueroseno). After a short introduction by the moderator, ***each panellist is invited to briefly present objectives and activities of the initiative in about 3 min (no ppt presentation).***

6) ***Policies and incentives for alternative aviation fuels (11:30 – 12:00)***

Until today the aviation sector has not been strongly involved in the establishment of the Renewable Energy Directive (RED) and its alternative fuel target. Aviation fuels have not been specifically addressed in the RED, however they may be counted towards the fulfilment of targets reported by Member States (MS). A reason for this was the infant stage of alternative aviation fuels in 2009 when the RED was launched.

At the CORE-JetFuel telephone conference in December 2013 it was discussed that the objectives of the European Advanced Biofuels Flight Path initiative, namely to achieve an annual production of two million tonnes of sustainably produced biofuel for aviation by 2020, will be very difficult to realize. The following main problems were identified hindering the large-scale market up-take of alternative aviation fuels:

- Lack of specific and coherent policies incentivising the scale-up of alternative aviation fuel production
- Lack of cooperation of civil aviation authorities with ministries responsible for policies on alternative fuels (e.g. Ministries of Environment)
- Lack of strong partnerships involving all actors of the aviation sector
- Current high costs of alternative aviation fuels hindering market demand
- Lack of investment and hesitation of the financial sector
- Difficulty to establish logistics for large-scale fuel supply (due to administrative barriers), including traceability challenges for book and claim systems

The panellists are invited to share their view on options for suitable policies and incentives for large-scale market up-take of alternative aviation fuels. Options for incentives include:

- Double and multiple counting
- Voluntary and mandatory targets
- Systems such as the US Renewable Identification Number (RIN) system

Each panellist will be asked for an intervention of 3-5 min.

7) Plenary discussion (12:00 – 12:15)

Participants of the Sustainable Aviation Fuels Forum are invited to ask questions to the panelists and/or express their view on options for suitable policies and incentives for large-scale market up-take of alternative aviation fuels.

8) Concluding panel discussion – role of CORE-JetFuel (12:15 – 12:30)

Each panellist is invited to present concluding remarks (2 min). Panellists are asked to briefly address the following questions in order to provide guidance on the way forward within the project CORE-JetFuel:

- Which may be the role of CORE-JetFuel to facilitate cooperation between the different national initiatives and EU policy discussion forums?
- How could the different initiatives be aligned to strengthen synergies and avoid duplicities?

We thank all panellists for their contribution to the Sustainable Aviation Fuels Forum in Madrid!!

4.3 Participants Sustainable Aviation Fuels Forum

NAME	ENTITY
Alejandro Ríos	MASDAR
Alessio Frasoldati	POLITECNICO di MILANO
Alexander Zschocke	LUFTHANSA
Alexandre Gohin	RENNES
Alexandre Rodrigues Filizola	ANAC
Alfredo Iglesias	AESA
Andreas Sizmann	BHL
Anne Bogdanski	FAO
Anne Bouter	IFPEN
Anne Laure Gaumerais	FRANCE DGAC
Annika Lindell	TRANSPORT STYRELSEN
Armando Salmerón	REPSOL
Arvind G. Rao	DELFT UNIVERSITY
Beatriz Guirao	CLH
Bhupendra Khandelwal	SHEFFIELD UNIVERSITY
Borja Alonso	CCE
Bruno Miller	METRON AVIATION
Carlos Alberto Fernández	IDAE
Carlos Menéndez de Solas	AESA
Carmen Rivera	SENASA
César Velarde	ICAO INDONESIA
Cristea Stelica	USAMvB
Christoph Jessberger	FHL
Christopher Lewis	ROLLS-ROYCE
David Chiaramonti	RE-CORD
David Raper	MMU
Delia Dimitriu	MMU
Dominik Rutz	WIP
Donald L. Smith	MC GILL
Ehsan Alborzi	SHEFFIELD UNIVERSITY
Eileen van den Tweel	KLM
Elena Lorente González	AESA-INECO
Eline Schapers	SKYNRG
Emanuel Fleuti	ZURICH AIRPORT
Florian Wolters	DLR
Flyn van Ewijk	QANTAS
Francisco J. Dominguez	IDAE
Franziska Mueller	DBFZ
Frederic Eychenne	AIRBUS GROUP
German Aroca	UCV

Hakan Olcay	SENASA
Hans Schlager	DLR
Heather Hamje	CONCAWE
Ibon Ibarrola	CLH
Inmaculada Gómez	SENASA
Isabel Maestre	AESA
Isabelle Lombaert-Vallot	AIRBUS GROUP
James Hileman	FAA
Jenny Walther-Thoss	WWF
Joanna Bauldreay	SHELL
Johannes Michel	FNR
John Shideler	FUTURE PAST
Joseph Burguburu	SNECMA
Julie Tolmie	MAPPING BOOK
Justo Hernández	PULLMANTUR
Laura Lonza	JRC
Laurens van Sterkenburg	DUTCH GOVERNMENT
Laurie Starck	IFPEN
Lukas Rohleder	AIREG
Manuel Sánchezblanco	SENASA
Marco Brusati	EC DG RTD
María de la Rica	SENASA
Maria de la Riva	SENASA
Martin Lange	UBA
Martin Porsgaard	NISA
Michael Lakeman	BOEING
Michael Wang	ANL
Michael Wolcott	WASHINGTON STATE UNIVERSITY
Nathalie Ledanois-Guérin	AIRBUS GROUP
Nathan Brown	FAA
Nicolas Jeuland	SAFRAN
Nikolaos Zarzalis	KIT
Nora Lamharess-Chlaft	SNECMA
Olivier Dubois	FAO
Olivier Penanhoat	SNECMA
Pascale Demoment	TOTAL
Patrick Bosmans	NATO
Patrick Le Clercq	DLR
Paul Smith	PENN STATE UNIVERSITY
Paul Verhoef	EC DG RTD
Paula Bruna Andrés	IDAE
Philipe Novelli	ICAO
Philippe Marchand	TOTAL
Piero Cavigliasso	BIOCHEMTEX
Pietro Caloprisco	ICSA

Prem Lobo	MST
Rainer Janssen	WIP
Ralf Stockel	TOTAL
Ralph Cavalieri	NARA & ASCENT
Robert Boyd	IATA
Robert Malina	MIT
Robert Wood	VIRGIN AUSTRALIA
Roger Lindfors	NESTE OIL
Rolf Nicholas Hogan	RSB
Ross Walker	AIRBUS GROUP
Ruben Alblas	KLM
Ruta Baltause	DG ENER
Sayuta Senobua	DGAC INDONESIA
Sergi Allegre	ARC
Sergio Ugarte	SQ CONSULT
Sigrun Matthes	DLR
Simon Blakey	SHEFFIELD UNIVERSITY
Simon Christie	MMU
Stefana Jurcoane	USAMvB
Ted McDonald	DEPT. TRANSPORT CANADA
Tharassos Panidis	PATRAS UNIVERSITY
Thiago Cestari	EMBRAER
Toni Kanakis	NLR
Toto Nugroho Pranatyasto	PERTAMINA
Uwe Fritsche	IINAS
Victor Daniel Archilla Prat	INTA
Victoria Mozo	SENASA
Volker Grewe	DLR
Wallace Tyner	PURDUE UNIVERSITY
Xavier Dommange	AIRBUS GROUP
Xavier Oh	ACI
Xavier Vancassel	ONERA
Yuri Herreras	CCE