



## CONFERENCE ON AVIATION AND ALTERNATIVE FUELS

Mexico City, Mexico, 11 to 13 October 2017

**Agenda Item 1: Developments in research and certification of aviation alternative fuels**

**Agenda Item 2: Financing and assistance programmes for aviation alternative fuels**

**MEXICAN CENTER FOR INNOVATION IN BIOENERGY (MCIB) – BIOJET FUEL CLUSTER**

(Presented by Mexico<sup>1</sup>)

### SUMMARY

Mexico has participated in several voluntary initiatives to reduce its emissions and contribute in mitigating the effects of climate change, including initiatives in the aviation industry.

The biojet fuel cluster of the Mexican Centre for Innovation in Bioenergy was created with the support of the Mexican Federal Government, to continue with the diagnostic and route mapping efforts that had been carried out in 2010 and 2011.

The objective is to contribute to the development and implementation of the supply chain of alternative aviation fuels, given the potential that Mexico has, and therefore, support the sector to accomplish the voluntary goals that have been established for 2020 and 2050.

## 1. INTRODUCTION

1.1 Mexico has carried out important efforts in the development and deployment of alternative aviation fuels. Evidence of this is was the “Flight Plan towards Sustainable Aviation Biofuels”, organized by the Mexican Federal Government through Aeropuertos y Servicios auxiliares (ASA), which was a stakeholder engagement process carried out in 2010 and 2011, whose objective was to identify the existing and missing elements of the value chain, and where all of the relevant actors in the industry were involved.

1.2 On the other hand, the completion of 36 biofuel flights, both for commercial and demonstration purposes, specifically: 1) the first transoceanic flight on a wide body aircraft, carried out by Aeromexico, from Mexico City to Madrid, Spain, in 2011; 2) participation in the “Flightpath to a

<sup>1</sup> The Spanish version of the paper was provided by Mexico.

Sustainable Future, Rio+20” initiative, in which the industry pulled together under ICAO’s leadership to fly the Secretary General of the organization from its headquarters in Montreal, Canada, to Rio de Janeiro, Brazil, with Mexico being responsible for the 3<sup>rd</sup> leg (Mexico City – Sao Paulo) on a flight operated by Aeromexico.

1.3 Also of note is the update of the *Action Plan for Mitigating the Emissions of Greenhouse Gases from Mexican Civil Aviation*, in its version 2015-2018, elaborated by the General Direction of Civil Aeronautics, which describes the measures to deal with the greenhouse gas emissions related to international aviation. Its voluntary character highlights the ethical pledge for environmental protection, while each of the actions contained in it, recognize the needed and realized efforts to achieve the sustainable growth of the national aviation industry, and contribute to the strengthening of the Federal Government’s public policies against the adverse effects derived from climate change.

1.4 In Mexico, the development of alternative aviation fuels is part of the strategy for reducing greenhouse gas emissions and, because of the efforts that have been carried out, it is recognized that activities related to research and development, as well as those that have to do with structuring and implementing policies to guarantee their economic viability, with the corresponding financial support, are also needed.

1.5 This document describes the endeavour for the establishment of the Mexican Centre for Innovation in Bioenergy, with its “BioJet Fuel Cluster”, which concentrates the efforts of Mexico to advance the development of this new industry, describing its participants, research lines, and objectives.

1.6 This Information Paper is presented to update the Conference on Alternative Aviation Fuels (CAAF2).

## 2. BACKGROUND

2.1 In 2008, the Mexican Federal Government established the Sectorial Fund CONACYT<sup>2</sup> – Ministry of Energy – Energy Sustainability (ESF) as an instrument for driving scientific research and applied technology, as well as the adoption, innovation, assimilation, and technological development in energy efficiency, renewable energy, use of clean technologies and diversification of primary energy sources.

2.2 The ESF supports the financing of research, development and innovation projects lead by research and academic institutions in the country, in collaboration with private sector companies and other interested parties. The support mechanism is given through public bidding processes. Every year, the Fund publishes requests for proposals on different thematic areas with specific focuses. Proposals are submitted for support consideration within one of these areas. The research topics or themes are defined by the Ministry of Energy, in accordance with the strategic direction of the Fund and sector.

2.3 The development of renewable energy technologies is an area of interest of the ESF, and it is one of the principal research areas where the scientific-technological community of the country has focused its efforts over the last several years. Specifically, in geothermal, solar, wind, ocean, and bio-energy.

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<sup>2</sup> CONACYT is the National Council for Science and Technology in Mexico (Consejo Nacional de Ciencia y Tecnología).

2.4 The “Mexican Centres for Innovation in Energy” have been supported since 2013 in each of the areas mentioned in the last sentence of the preceding paragraph, for a total of ~110 million dollars.

2.5 Towards the end of 2015, the “Mexican Centre for Innovation in Bioenergy” (MCIE – Bio) was announced, with 5 chapters or clusters: bio-alcohols, advanced biodiesel, solid biofuels, biogas, and biojet fuel. The MCIE – Bio was awarded ~39 million dollars.

### 3. STRUCTURE AND OBJECTIVES

3.1 The biojet fuel cluster began operations in 2016 and the leader of the consortium is one of the public research centres of the CONACYT system, the Potosinian Institute for Scientific and Technological Research (Instituto Potosino de Investigación Científica y Tecnológica – IPICYT). The biojet fuel cluster was awarded ~21 million dollars of the total ~39 million for the MCIE – Bio (54%). The remaining resources (~18 million dollars) were awarded to the other 4 consortia.

3.2 The biojet fuel cluster is integrated by 9 national public research centres, 2 international research institutes (Masdar Institute, a part of Khalifa University of Science and Technology, and the Joint Bioenergy Institute), 2 private national companies (Aeromexico and QENER), and 1 international company (The Boeing Company).

3.3 The biojet fuel cluster has at its core a 4-year research and development programme, that looks to advance the implementation of this new industry in Mexico. It has 4 basic research lines: 1) biomass production, 2) transformation processes, 3) sustainability, and 4) market development.

3.4 Biomass production: generate technological packages for the production of jatropha curcas, jatropha platyphylla, Salicornia, castor, and lipid and lignocellulosic residues. These are the principal biomass types being considered but others can be added.

3.5 Transformation processes: generate technologies for the production of alternative aviation fuels, through 2 demonstration plants, one for oils and one for alcohols.

3.6 Sustainability: generate national capacity to sustainably certify each of the links in the supply chain of these fuels, determine the lifecycle analysis and come up with national indicators.

3.7 Market development: advance the economic viability through the generation of business plans related to alternative fuels and the associated products to the value chain.

3.8 One other key activity of the cluster is the implementation of synergies with relevant stakeholders, such as the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (MALRDFF or SAGARPA in Spanish), the Ministry of Environment and Natural Resources (MENF – SEMARNAT), the Civil Aviation Authority, the Ministry for Communications and Transport (SCT) through Aeropuertos y Servicios Auxiliares (ASA), consortiums in other countries and international organizations.

3.9 It’s in the interest of the Ministry of Energy (SENER) and the biojet fuel cluster to participate in global discussions to share experiences and be up to date with the learned lessons and challenges of other initiatives.

#### 4. IDENTIFIED CHALLENGES

4.1 The efforts of the biojet fuel cluster have been useful for identifying the main challenges for the implementation of aviation alternative fuels in Mexico.

4.2 Legal framework: even though Mexico has a Bioenergetics Promotion and Development Law since 2008, this instrument does not take into consideration the aviation industry. A harmonization of the current legal framework is needed to facilitate the implementation of the industry.

4.3 Costs: it is recognized that important steps have been taken in the production of alternative aviation fuels worldwide, however, it is difficult to imagine that in the short term the price of alternative fuels will be competitive with the ones based on fossil resources, and therefore, economic support is needed (incentives) in each one of the links of the value chain, including the air operators, until the cost gap is reduced and finally closed.

4.4 Biomass production: Mexico, and in general the Latin American region, are characterized by their significant potential for the generation of crops that can be used to produce alternative fuels. In this respect, important coordination efforts are needed between the main actors (SAGARPA, SEMARNAT, SCT-ASA, CONACYT, potential producers) to generate biomass production at sufficient scale and with appropriate sustainability criteria to satisfy the aviation industry's demand.

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