EVENT SUMMARY: RSB AVIATION BIOFUEL SUMMIT

With a delegation of high-profile local and international speakers and nearly 80 attendees representing all walks of the Ethiopian agricultural, biofuel and aviation industries, including 4 state ministers, Africa’s first RSB Aviation Biofuel Summit was deemed a great success by all stakeholders.

The event, hosted at the Hilton Hotel in Addis Ababa on Tuesday 20 March 2018, presented the opportunities provided by the growing aviation biofuel market through informative presentations and case studies, and culminated in the signing of a Memorandum of Understanding between the Roundtable on Sustainable Biomaterials (RSB) and the Ethiopian Ministries of Industry, Science & Technology, and Mines Petroleum and Natural Gas, which paves the way for further collaboration to research and develop aviation biofuels in Ethiopia.

Key highlights from each presentation

**Rolf Hogan, Executive Director, Roundtable on Sustainable Biomaterials (RSB)**
- Ethiopia has a high potential to develop sustainable bio jet fuels in the future;
- RSB is a global, multi-stakeholder organisation that drives the development of the bioeconomy for a better world through sustainability solutions and partnerships;
- RSB works with many aviation biofuel projects in the world, and aims to build similar partnerships in Ethiopia;
- RSB certification for biofuels is widely supported by the aviation industry;
- RSB members include UN organisations, industry bodies, businesses and civil society;
- This summit aims to build relationships, share knowledge and identify synergies.

**H.E. Dr Mebrahtu Meles, State Minister of Industry**
- The Ethiopian economy is dependent on agriculture, which accounts to 40% of the total GDP;
- Ethiopia has a solid Industrial Development Strategy and Roadmap, which includes the creation of industrial parks.
- The country is seeing a rapid economic growth and aims to achieve middle-income status by 2025. Focus on value-adding activities and on exports;
- The government is committed to promote joint ventures with the private sector and drive private investment into Ethiopian industries;
- Biofuel is a key industry for Ethiopian industrial development.
H.E. Dr Koang Tutlam, State Minister of Mining, Petroleum and Natural Gas

- Ethiopia is fast growing, as are its energy requirements;
- Hydrocarbon demand increasing by 10% per annum, and electricity by 25%;
- There is a need to invest in clean and sustainable energy that reduces Greenhouse Gas emissions and drives agricultural development;
- Biofuels can be used for transport, cooking and industrial use, and the development of a local industry can reduce oil imports and save foreign currency;
- Biofuels are being blended with conventional fuels since 2007. There are two ethanol plants producing about 30 million litres per year.
- Ethiopia has an ambitious target to achieve production of 1.7 billion litres of biofuels per year from sugarcane molasses thanks to new plants being planned.

Elizabeth Wood, Regional Director Environmental Strategy & Integration, The Boeing Company, presenting on behalf of the Air Transport Action Group (ATAG)

- Aviation is a complex system with half a billion passengers taking off on 36 million flights run by 1402 commercial airlines every year;
- In Africa alone, air transports supports 6.8 million jobs, and air traffic for African carriers is expected to grow by nearly 6% annually over the next 20 years, mainly thanks to the region’s overall economic growth;
- This growth comes with the environmental responsibility to address our emissions, which contribute to climate change;
- CO2 efficiency has already been dramatically improved by technology and operational measures, such as more efficient engines which burn less fuel and use of lighter materials;
- Sustainable fuels can further reduce emissions by up to 80% compared to traditional fuels, and can use a wide variety of feedstocks from both crops and waste sources, such as used cooking oil or even municipal waste;
- Over 5500 commercial flights used biofuel blends in 2016;
- The aviation sector is fully committed to climate action and sustainable alternative fuels are critical for meeting the industry goals of achieving 1.5% annual average fuel efficiency improvement from 2009 to 2020, stabilising net aviation CO2 emissions at 2020 levels with carbon neutral growth, and, by 2050, reducing net CO2 emissions by 50% of what they were in 2005;
- There is a renewed desire to work with Ethiopia and the national carrier Ethiopian Airlines, and this summit is bringing the right people at the table to drive this conversation.

Arianna Baldo, Africa Representative, Roundtable on Sustainable Biomaterials (RSB)

- The global bioeconomy employs nearly 20 million people in Europe alone, and over 135 billion litres of biofuels annually will be produced by 2019 globally;
- The growth of biofuels is inevitable (as oil resources are finite), unstoppable (there is a mushrooming of partnerships driving R&D of bio-based products, and aviation industry aims to have 1 billion passengers flying on aviation biofuels by 2025), and needs to be sustainable and have a positive impact on job creation and the country’s economy;
- In order to be truly sustainable, biofuels must ensure that the net GHG emissions are reduced, that there is no competition with food production, and that its development does not negatively affect soil, water and natural environments;
- Sustainability also helps project identify and mitigate key risks and increase trust with investors and stakeholders;
- The 12 RSB principles cover every aspect of sustainability, from soil and water, to food security and rural development.
Oskar Meijerink, Business Development Manager, SkyNRG

- Bio-based kerosene production is a renewable process, and biojet can be produced from a variety of feedstocks;
- Currently, there are 5 technologies which are certified under ASTM to convert feedstock into aviation biofuel, with many more in the pipeline. Two of them use sugars as feedstock.
- Depending on the conversion technology used, biojet can be blended for up to 50% with conventional jet fuel. The final fuel blend is considered as ‘drop-in’, i.e. it requires no engine or infrastructure modifications.
- There is currently one biojet refinery in the world, producing roughly 30,000 tons of aviation biofuel per year (AltAir in California, using used cooking oil and animal tallow as feedstock). There are however many more in the demonstration and pilot stages globally.
- Biojet development requires the collaboration of multiple stakeholders, including airlines, airports, governments, corporates and individual travellers.
- The price premium of biojet is still an important challenge for the industry. SkyNRG has developed a number of successful models to overcome this, such as for example the KLM Corporate Programme and the Fly Green Fund, which SkyNRG takes part in.

Tjaša Bole-Rentel, Energy Economics and Policy Specialist, Policy Futures Unit, WWF South Africa

- Africa is seen as one of the major expansion areas for the production of biofuel feedstock, yet the sustainability of large-scale supply depends on available resources vis-à-vis demand for food and need to safeguard natural environments;
- Research conducted shows that Ethiopia has the 2nd highest technical potential for the production of biofuels in Africa;
- This potential estimate takes into account the environmental and food security RSB principles, which means it excludes areas needed for current and future food production and environmental conservation including forests;
- Key biofuel feedstocks such as sugarcane, sorghum, cassava, jatropha and oil palm were included in the research;
- Approximately 33 million hectares of Ethiopian land (or 30%) has been identified as potentially available for purposes other than food production and environmental protection; however only about 8% of it, or 6.6 million hectares, is very or moderately suitable for the production of energy crops;
- Ethiopia could produce up to 60 Petajoules (PJ) of energy with sugarcane, which is the equivalent of about 1.7 billion liters of bio jet fuel. However, this is likely to fall to 31 PJ in 2050 due to the adverse effects of changes in climate and increased demand for land for food production;
- Ethanol pathways are usually more productive (in terms of energy/ha) than vegetable oil ones;
- Local value chains are needed in order to achieve the required GHG emission savings.

Endawek Abite, CEO, Ethiopian Sugar Corporation

- There are favourable agro-climatic conditions for sugarcane production in Ethiopia, high productivity per hectare (approx. 150 tons/ha), and high sucrose content (10-14%);
- There are currently 13 sugar mills, 8 of which are completed and 5 are in development;
- Ethanol is currently being produced from molasses. It takes approximately 1 ton of molasses to produce 250 litres of ethanol;
- Ethiopia currently produces 28 million litres of ethanol per year across two plants, with a third one being developed as we speak;
- It is imperative for Ethiopia to de-carbonise the transport sector in order to achieve global climate change mitigation. Bioethanol from sugarcane is also a potential solution for aviation biofuels.

Samantha Hampton, Business Development and Sustainability, Sunchem

- Sunchem developed a nicotine-free tobacco variety called Solaris, which aims to provide an alternative and sustainable source of protein and vegetable oil to world markets;
• The Solaris plant provides oil and high protein cake from its seeds, which can be used as biofuels and animal feed, and leaf protein and fibre from its biomass, which can be used as protein for human consumption and fibre for the paper industry;
• Solaris tobacco is unique insofar as it has significant higher yields than other crops such as canola, soybean and sunflower (up to 3 times more yield). It can be harvested multiple times per season, and its oil can achieve up to 85% GHG emission reduction compared to fossil fuel;
• A key lesson from Solaris is the importance of integrating different markets in one feedstock, so that income is made by the various co-products (e.g. cake, fibre) and does not rely on one sole market (e.g. oil for biofuel production);
• It is critical to establish public-private partnership, as well as suitable policy frameworks, to support biofuel production until economies of scale enable a fully independent initiative.

Michael Gessese Tesema, Director of the Biofuel Development Coordination Directorate, Ministry of Mining, Petroleum and Natural Gas

• Ethiopia’s expenditure on oil imports is intolerably high, taking over 20% of export earnings;
• Biofuel development is sensible given the uncertainty of future petrol-fuel reserves, growing climate change pressure, and the potential to benefit local job creation;
• Ethiopia has a series of policies and strategy measures to develop the sector and drive import-substitution. The 2007 biofuel strategy takes into account the favourable local environment, including land potential, suitable climate and large labour force available;
• Ethanol blending started in 2008 at 5%, and was increased today to 10%;
• Some key challenges include: erratic ethanol supply, lack of harmonisation between policies and strategies, lack of financing and efforts to further develop the market, and low research activities to support biofuel development;
• Key intervention areas to ensure success of biofuel industry in Ethiopia are: build capacity of institutions to develop strong regulations and standards; scale up technology development and support ethanol industries to secure flawless and reliable supply of ethanol; and drive public private investment to grow the industry and create jobs.

Meseret Bitew, CFO, Ethiopian Airlines

• Ethiopian Airlines is a fast-growing airline with 8.8 million passengers serviced annually with 97 planes, and 59 more aircrafts being added to the fleet within the next 5 years;
• Key hubs include Addis Ababa, Lomé and Lilongwe. Africa is in a strategic position as nearly 6 billion people live within a 10-hour flight radius from Addis.
• The airline has been awarded Skytrax 4 Star Airline Certification in 2017 and its vision is to triple its number of passengers by 2025;
• Fuel supply and cost is a key challenge. Jet fuel takes between 30 to 40% of the airline’s total operating costs (approximately USD 100 million / month), and crude oil is a volatile commodity, making the price unpredictable;
• In Africa, fuel price is even more volatile due to political, economic and social disorders, and is furthermore highly taxed;
• Ethiopian Airlines supports the development of alternative options to enable the company fulfil their jet fuel demands. Biofuel has the potential to be a valid solution for the future.

Dr Laurel Harmon, VP Government Relations, Lanzatech

• Lanzatech recognises that many products we use every day need carbon, including aviation fuels. This carbon can however be renewable.
• Lanzatech produces fuel ethanol from renewable, non-food resources, including industrial flue gases and other waste gases, such as those produced from the gasification of municipal solid waste and waste biomass.
• Lanzatech is headquartered in Chicago, has business operations in China and India, and a joint venture in South Africa.
The journey to develop the technology, prove it a lab scale and then commercialise it took 12 years and the collaboration of key public and private partners including institutions (US Department of Energy), aviation stakeholders and offtakers (Boeing, Virgin Atlantic), and investors (HSBC);

Full scale is expected to be achieved by 2021, with tens of millions of gallons of jet fuel produced from waste industrial gases;

There are abundant wastes and residues across Africa which can be used as feedstock for ethanol production, including agricultural wastes, municipal solid waste, refinery offgases, steel mill offgases, and ferro-alloy offgases;

Recycling wastes into fuels provides new revenue streams from an otherwise waste materials, creates green jobs, does not impact on land or food security, and meets the growing energy demand.

Next steps

MoU signatories, with the support of key stakeholders such as WWF South Africa, will be drafting a terms of reference to establish an inter-ministerial and multi-stakeholder Steering Committee to drive aviation biofuel research and development in Ethiopia. The Steering Committee is expected to be established by end of Q2 2018, and to be headed by the Ethiopian Ministry of Industry.

The Steering Committee will be working on an aviation biofuel roadmap for the country, which is expected to include the following activities:

- Organise regular meetings;
- Conduct a study to compare Ethiopian biofuel standards and regulations with the RSB standards, with the aim to identify gaps and opportunities for institutional strengthening;
- Develop a case studies on key feedstocks and technologies;
- Benchmark with Ethiopia’s existing biorefinery strategies;
- Instigate further collaborations and project development opportunities with the private sector and with institutional funders.

Signing of the MoU. From left to right: Michael Gessese Tesema (Director of the Biofuel Development Coordination Directorate, Ministry of Mining, Petroleum and Natural Gas), H.E. Dr Shumete Gizaw (State Minister of Science & Technology), H.E. Dr Mebrahtu Meles (State Minister of Industry), and Mr Rolf Hogan (Executive Director, Roundtable on Sustainable Biomaterials).