

**GBEP Working Group on Capacity Building
for Sustainable Bioenergy (WGCB)**

GBEP 8th Bioenergy Week
16-18 March 2021

Summary

The 8th Bioenergy Week of the Global Bioenergy Partnership (GBEP) was successfully held online from 16 to 18 March 2021 as part of efforts of the GBEP Working Group on Capacity Building for Sustainable Bioenergy (WGCB) to facilitate cooperation and capacity building on the potential benefits of sustainable modern bioenergy. The event was organised by the Global Bioenergy Partnership in collaboration with the Food and Agricultural Organization of the United Nations (FAO), United Nations Economic Commission for Africa (ECA), African Energy Commission (AFREC) and African Union Commission (AUC), with the kind financial support of the US Grains Council.

In light of the COVID-19 global pandemic, the event was held virtually. This allowed for participation of representatives from international development agencies, Government officials, civil society organizations, private sector players in the bioenergy sector and academia from all over the world. An interpretation service in English and French was also provided to participants.

The event was the most recent in the series of GBEP Bioenergy Weeks that have been held every year since 2013. This year's Bioenergy Week focused on Africa, including discussions on the status of the bioenergy sector as well as highlighting positive experiences and initiatives in the sustainable production and use of bioenergy that could guide the design and implementation of bioenergy policies on the continent. The event also provided a platform to further the dialogue with the private sector and stakeholders on ways to improve mutual cooperation towards a more sustainable production and use of bioenergy.

Contents

Day 1 – Tuesday 16 March 2021	3
Opening Session.....	3
Session 1: Global Regional and National Policies.....	4
Session 2: Sustainable Value Chains for Food and Energy Security	6
Session 3: Bioenergy reporting and statistics in Africa	9
Day 2 – Wednesday 17 March 2021	11
Session 4: Sustainable bioenergy as a contribution to land conservation and restoration.	11
Session 5: Liquid biofuels in urban areas	14
Session 6: GBEP Youth Award	15
Day 3 – Thursday 18 March 2021	17
Session 7: Bioeconomy Opportunities in Africa.....	17
Session 8: Discussion in break-out groups. (The outcomes of the Bioenergy Week and future vision of bioenergy in Africa.).....	18
Session 9: Roundtable discussions – Bankability of bioenergy projects: Challenges and Opportunities.....	19
Conclusions and Closing Remarks	21

Day 1 – Tuesday 16 March 2021

Opening Session

The Eight Bioenergy Week was opened with welcome remarks from Mr. William Lugemwa, on behalf of the Executive Secretary of the UN Economic Commission for Africa (ECA) and UN Under-Secretary; Dr David Phiri, FAO Sub-regional Coordinator for Eastern Africa & Representative to the African Union (AU) and ECA; Amb. Luiz Eduardo de Aguiar Villarinho-Pedroso, Ambassador of the Federative Republic of Brazil, representing the GBEP Co-chair; and Her Excellency, Dr Amani Abou-Zeid, Commissioner for Infrastructure and Energy, AU/AFREC.

Mr. William Lugemwa, on behalf of the Executive Secretary of UNECA and UN Under-Secretary, welcomed the participants to the Eighth Bioenergy Week and expressed pleasure to host the event virtually on African soil. The theme for this year's Bioenergy Week, "to enhance learning from positive experiences on the sustainable production and use of bioenergy to support the design and implementation of bioenergy Policies in Africa", resonates with Africa's priorities. It is linked to AU-ECA efforts of transforming the bioenergy development in Africa, following the adoption of the [Africa Bioenergy Policy Framework and Guidelines](#) resolution by African Heads of State which has been a guiding force in mainstreaming the use of modern bioenergy in the respective country energy plans and increasing investments in the bioenergy subsector. There are massive opportunities for cooperation in the development of a modern bioenergy economy and GBEP could play a catalytic role. Additionally, countries need to appoint bioenergy development champions (political and private sector) to rally increased support at country and regional level.

Dr. David Phiri welcomed participants and expressed his pleasure for the fact that the Eighth Bioenergy Week was focusing on Africa. He further expressed his gratitude to UNECA, AUC, AFREC, FAO and the GBEP Secretariat for joining efforts to organise the event as well as the Government of Brazil for their support as Co-Chair of GBEP. His remarks underscored the fact that FAO greatly upholds Sustainable Development Goal 7 (Access to affordable and clean energy), considering the key enabling role of modern energy in achieving food security and better nutrition. Food systems, which currently consume 30 percent of global energy, need to gradually deliver more food with less and cleaner energy. Access to clean and modern energy is one of the requirements for guaranteeing the well-being and development of the rural population. Sustainability is at the core of FAO and GBEP activities and as such the GBEP Sustainability Indicators for assessment of bioenergy have been developed, with capacity building undertaken in different African countries such as Ghana, Kenya, Ethiopia and Togo to guide policy makers towards adopting a sustainable development path with the use of bioenergy. The Eighth Bioenergy Week themes are of critical importance to Africa, especially regulatory and institutional frameworks, sustainable value chains for food and energy security and financial mechanisms supporting bioenergy systems. The Bioenergy Week provides a concrete example of corporate partnership to further the achievement of SDGs that have a linkage to energy.

Amb. Luiz Eduardo de Aguiar Villarinho-Pedroso, Ambassador of the Federative Republic of Brazil, representing the GBEP Co-chair, congratulated FAO, AFREC, UNECA, AUC and the GBEP Secretariat upon the successful organisation of the Eighth Bioenergy Week. African Countries present great potential for bioenergy development, including *inter alia* crop-based biofuels. Therefore, the deployment of bioenergy solutions is of relevance in the face of growing economic and demographic prospects on the continent which lead to an ever increasing energy demand. The Brazilian experience offers a clear example of the role of bioenergy in the realisation of a low carbon future. From 1975 – when a mandatory Ethanol plant was established in the country – to 2018, the

Brazilian ethanol policy has prevented the use of up to 2.15 billion barrels of oil equivalent. This Bioenergy Week not only presents an opportunity to learn more about the specificities of African countries in the use and production of bioenergy, but also provides a platform to exchange experiences and find lasting solutions to key issues in the bioenergy sector.

Her Excellency, Dr Amani Abou-Zeid, Commissioner for Infrastructure and Energy, AU/AFREC reiterated the strong role played by renewable energy and noted that for the first time in the last twenty years, access to electricity has declined due to the COVID-19 pandemic. Over 900 million people in Africa do not have access to clean cooking solutions and this calls for collective efforts by sector players and Governments to devise a strong post-COVID recovery that is more resilient and takes into consideration green technology to accelerate the use of bioenergy in the continent. In 2019, African Union completed and adopted the Bioenergy Development Strategy and Investment Plan and it is being piloted in West Africa. She also commended FAO and AFREC for the capacity building programmes conducted on bioenergy monitoring and assessment in African countries, and concluded that the sustainable utilisation of the locally available energy resources that Africa is heavily endowed with can alleviate the existing challenges to energy access while creating green jobs and advancing industrial development.

Session 1: Global Regional and National Policies

The session commenced with a live poll facilitated by **Dr. Maria Michela Morese**, GBEP Executive Secretary, aimed at understanding the motivation for participation to the Bioenergy Week. In response to the live poll question, “*why have you joined the GBEP Bioenergy Week?*”, the majority of the participants noted that their interest in this year’s Bioenergy Week was to understand more about bioenergy and stay up to date with the new related initiatives in Africa.

The session was moderated by **Mr. Robert Lisinge**, Chief, Energy, Infrastructure and Services Section, ECA, who introduced the different speakers of the session as well as their respective topics.

Mr. Ilkka Hannula, Senior Energy Analyst, International Energy Agency (IEA), presented on the IEA global vision for bioenergy in regional and local strategies to accelerate deployment. His presentation emphasized that the last decade has seen a massive increase in the adoption of solar and wind energy and this trend is expected to continue in the future. Solar is expected to become the cheapest and most deployed form of renewable energy on a global scale. The IEA Sustainable Development Scenario (SDS) projects that the renewable energy share of electricity will surpass 80 percent in 2050 and reach 87 percent by 2070, mainly driven by solar and wind energy, and complimented by bioenergy, hydro power and nuclear energy. However, currently, industry, transport and energy for heating/cooling buildings account for half of the CO₂ emissions, therefore in order to meet the said projections, there is need for increased decarbonisation of the mentioned sectors. The SDS projects that by 2030 hydrogen-based fuels as well as bioenergy will account for about 20 percent of the final energy use. However, this requires the accelerated the use of biofuels in sectors such as aviation and shipping. Costs remain an issue in accelerating the use of biofuels; the cost competitiveness of biomass for electricity production and biofuels is dependent on bioenergy feedstock costs. Additionally, biofuels face cost competition from subsidised fossil fuel energy prices, therefore supporting strong policies as well as cost reduction are critical for the increased adoption of biofuels. Sustainability of bioenergy and other clean energy options must be measured and rewarded to compensate for the cost gap with fossil fuels.

Mr. Rashid Ali Abdallah, Executive Director, AFREC/African Union, shared an overview on the role of bioenergy in the African energy sector. The energy sector in Africa is dominated by

petroleum and bioenergy. Traditional biomass forms an important source of energy in Africa and is mainly consumed at household level for cooking. As of 2018, West Africa (58.8 percent) accounted for the largest share of firewood production followed by East Africa (20.4 percent), and Central Africa (10.94 percent). Charcoal production on the other hand is dominated by East Africa (36.4 percent) and West Africa (32.6 percent). Despite the strategic importance of bioenergy in Africa, among other challenges, there are inefficiencies in the value chain, some countries lack clear regulatory frameworks and standards/guidelines for bioenergy use, and there are no targets on the share of bioenergy in the energy sector at national level. In order to ensure increased adoption of bioenergy, there is need to develop complementary national policies, strategies and strong regulatory frameworks based on Africa's energy vision.

Mr. Michael Gessese Tesema, Director General, Ethiopian Rural Energy Development and Promotion Center, Ethiopia, gave a presentation on rural bioenergy development and promotion in Ethiopia. The country has abundant and diverse renewable energy resources but these are insufficiently exploited. Biomass currently accounts for 86 percent of total energy consumption. The current Ethiopian Energy Policy was approved in 1994 and tackles many issues related to bioenergy, including high degree of dependence on biomass, unsustainable use, lack of regulations and standards, and lack of access to financing, among many others. The Bioenergy policy objectives are therefore threefold: i) to ensure sustainable forest management policy instruments; ii) to enhance diversity and efficiency in bioenergy production; and iii) to ensure bioenergy supply security. The Ethiopian Rural Energy Development and Promotion Centre (EREDPC) has devised a 10-year strategic plan to work on these issues and improve energy access, efficiency and security in rural areas of the country.

Dr. Maria Michela Morese, Executive Secretary, GBEP, presented on the contribution of the Global Bioenergy Partnership (GBEP). Her presentation highlighted the fact that globally, 2.8 billion people lack access to clean cooking technologies and in Africa only 47 percent of the population has access to electricity, which demonstrates the need for renewable energy adoption, especially bioenergy. Since its establishment in 2006, GBEP has played an important role in supporting its partners to integrate bioenergy within their renewable energy pathways for sustainable development. FAO is a founding Partner and hosts the GBEP Secretariat at the FAO Headquarters in Rome. GBEP is currently chaired by Brazil and comprises 38 Partners and 44 Observers, which includes Governments and International Organizations with good participation of African countries. One of the achievements of GBEP is the development of a set of 24 indicators used to monitor and report on the sustainability performance of bioenergy production in a country. The 24 indicators are premised on the three pillars of Sustainable development, namely, Environmental, Social and Economic pillars with 8 indicators under each pillar. A corresponding [report](#) was developed as a user guide for countries to assess the respective indicators and design appropriate policies to support their bioenergy development. These indicators have so far been measured in 14 countries, whilst 2 countries are in the process of implementing the same. The GBEP assessment also helps countries to monitor progress on the achievement of their Nationally Determined Conditions (NDCs) under the Paris Agreement as well as the Sustainable Development Goals.

Suffice to note that GBEP has been at the forefront of supporting regional and national initiatives aimed at fast tracking bioenergy development. Case in point is the support given in the development of the ECOWAS Regional Strategy on Bioenergy that was adopted in 2012 and validated by partner Governments in 2015, as well as Technical support given to countries such as Kenya, Ethiopia, Togo, Ghana, Colombia, Indonesia, Paraguay and Vietnam for activities related to sustainable bioenergy development. She concluded by emphasizing the critical role of bioenergy in decarbonising the agriculture and forestry sectors, therefore, its sustainability is hinged on the continued monitoring and routine assessments to evaluate and improve the performance gaps.



Figure 1: Interactive Slido word cloud.

Improved livelihoods, sustainable jobs, climate change mitigation, circular economy, biochar, energy poverty reduction, gender equity and clean cooking were noted as the greatest opportunities for bioenergy.

Session 2: Sustainable Value Chains for Food and Energy Security

Dr. Maria Michela Morese opened the Session with a live poll to guide the discussions on the thematic area. In response to the live poll question, “*What do you think are the most important factors in ensuring the sustainability of value chains*”, the majority of participants noted the existence of an enabling policy environment, adaptation to local context, technical capacity and sustainable availability of feedstocks as the most important factors for ensuring sustainable value chains.

This Session was moderated by **Mr. Crispin Zana**, Principal Energy Advisor to the African Union Development Agency (AUDA-NEPAD), Secretariat of the Africa-EU Energy Partnership (AEEP).

Mr. Guei Guilherme Fulbert Kouhie made the presentation on behalf of **Mr. Bah F.M Saho**, Executive Director, ECREEE, Praia, Cape Verde, highlighting the ECOWAS regional experience with programmes supporting sustainable value chains. He highlighted that in the ECOWAS region, 52 percent of the population, totaling 176 million people, do not have access to electricity, whilst there is widespread traditional use of firewood and charcoal, currently 90 percent of total domestic energy consumed. Therefore, the ECREEE Bioenergy Policy is to harness the biomass potential that will increase access to sustainable energy services through the deployment of sustainability criteria in the production, transformation and utilization of the biomass (including bio-waste) without compromising food security. This includes a number of targets for 2030, including 100 percent share of population utilizing improved cook stoves, and 100 percent share of efficient charcoal production. Mr. Kouhie concluded by stating that, to harness the potential benefits of biomass without creating new pressures on natural resources, and to harness investor interest for development purposes, policies and strategies adapted to the national context are critical. Furthermore, bioenergy policies and strategies need to be based on science and be developed through processes that engage stakeholders.

Ms Kornelia Ipinge, SACREEE, Namibia, shared the experience of the SADC region with programmes supporting sustainable value chains. In order to support sustainable value chains, enabling policies have been put in place such as the SADC Green Economy Strategy and Action Plan for Sustainable Development that was developed in 2015 and focuses on agriculture, water, forestry

and biodiversity among others, as well as the Bioenergy Development Strategy and Investment Plan for Southern African Region from 2019 to support modernization of the bioenergy sector.

Except for Mauritius and Seychelles, other SADC members are still heavily reliant on traditional biomass and other solid fuels such as coal for cooking purposes. The potential for biopower production in the SADC region is about 9 500 MW from agricultural waste alone. Bagasse is already in use by sugar producing companies in seven member states (Eswatini, Malawi, Mauritius, Mozambique, South Africa, and Zimbabwe). Some of the challenges noted in supporting value chains include: lack of up-to-date statistics on biomass and logistical issues in transporting feedstock to the production plant location. In a bid to promote sustainable value chains, there is need to: engage stakeholders on bioenergy best practices; provide continuous capacity building, technology transfer, and technical assistance; and provide a conducive business environment for bioenergy investments to thrive.

Mr. James Ogbonna, University of Nigeria, Nsukka, presented on sustainable bioethanol and biogas from cassava as an opportunity for food security. Africa produces around 60 percent of the world total fresh cassava tubers, with Nigeria producing 20 percent. Nigeria spends USD 480 million on the importation of ethanol even though it can be produced from cassava. The current world ethanol market stands at USD 93.7 billion and is projected to rise to USD 155.6 billion in 2030. Cassava doubles as an energy and food crop. As an energy crop, it can be hydrolysed, fermented and distilled to make bioethanol. Likewise, as a food crop the residues can be used to make bioethanol. Mr. Ogbonna asserted that the use of cassava for bioethanol production presents an opportunity for the establishment of biogas companies and small-scale ethanol production companies who can eventually sell their raw ethanol to large scale re-distillation, rectification and dehydration companies for refining. He suggested that the benefits of bioenergy production in Africa outweigh the possible adverse effects on food security as it attracts more investments in the agricultural sector, while creating a community-based energy system which is more reliable and effective. Furthermore, the establishment of bioenergy and food processing industries makes agriculture more lucrative as the demand for crop yield increases to meet the food and energy needs. Bioenergy therefore, remains one of the most viable options for energy security in Africa and should not be looked at as a threat to food security but rather an opportunity to solve the energy poverty gap and feeding needs.

Mr. Medhat El-Helepi, ABEE, UNECA, made a presentation highlighting the role of bioenergy in enhancing agricultural value chains. Africa represents about 20 percent of the world's mass land, accommodates about 16 percent of the world's population and produces only 7 percent of the world's energy production. Energy demand across the African continent is expected to reach 1000 Mtoe in 2030 with serious implications for energy security. In Sub Saharan Africa, traditional biomass still dominates the energy mix with about 56 percent of the total final energy consumption generated from biomass and waste. Despite the abundant natural resources in Africa, there is limited use of modern energy in the agricultural sector thus exacerbating food insecurity and poverty levels. Bioenergy, therefore, presents a great opportunity to modernise the agriculture sector and improve productivity through provision of locally produced biofuels for powering motorized agricultural equipment. This ultimately enhances food production, distribution, processing and trade while addressing key environmental challenges through undertaking afforestation and agroforestry programmes. In order to maximise the benefits of bioenergy in the agriculture value chains, there is need to foster adoption of the Africa Policy Framework and Guidelines for Sustainable Development of Bioenergy in addition to accelerating adaptation to second generation technologies for conversion of biomass into biofuels to enhance energy security without creating competition on land for food production.

[Mr. Farhan Nakhooda](#), Project Director, Kakira Sugar Limited Uganda, presented on co-generation in Africa. Kakira Sugar Limited is Uganda's largest sugar company with factory capacity of 7 500 tonnes of cane per day and annual sugar production of 180 000 tonnes. The factory produces 51 MW of power from cogeneration of bagasse, exporting 32 MW to the national grid, and has an ethanol plant with capacity of 22 million litres of ethanol that can be used for fuel blending. The benefits of bagasse cogeneration include increased cost savings on electricity purchases, and improved reliability and quality of electricity supply resulting in reduced production losses. Renewable energy generated from biomass also helps to reduce carbon emissions with increased replacement of fossil fuels. In order for cogeneration activities to flourish, there is need for the following factors, among others: introduce supporting policy frameworks which recognise the fact that bioenergy/cogeneration projects are intrinsically different from large hydro and thermal projects; recognise the consolidated contribution of smaller renewable energy projects since their contribution is as equally important as one large project; introduce attractive feed-in-tariff plan for renewable energy; and allow for *wheeling* and *banking* for seasonal bioenergy IPPs.

[Mr. Harry Stokes](#), Project GAIA, presented on proving the opportunity of cooking with ethanol in Ethiopia: Gaia Clean Energy. Project Gaia is a non-profit organisation that focuses on alcoholic fuels as an alternative source of fuel-based energy in the developing countries. The project focuses on ethanol for cooking and fuel application for the transport sector. There are currently thirteen sugar factories planned or under construction in Ethiopia with a current production capacity of 400 000 million tonnes of sugar and 21 million litres of ethanol, whereas the projected production capacity stands at 3.6 million tonnes of sugar, 339 million litres of ethanol and 250 MW of excess power exported to the national grid. Project Gaia is at the forefront of promoting micro distilleries that produce ethanol from dedicated feedstock and the majority of these distilleries are run by women, which creates jobs to improve their livelihoods. The company is also exploring ethanol production from beans. In this case, the feedstock will be the excess beans that fail to make it to the export market and the product outcomes include concentrated protein for human consumption, ethanol for fuel and animal feed.

[Ms Esther N Nyanzi](#), Chief Executive, Uganda National Renewable Energy and Energy Efficiency Alliance, Uganda, made a presentation on increasing food security through bioenergy plants: The experience of the East Africa Renewable Energy Partnership (EAREP) Project. Agricultural residues, sustainably harvested can lead to increased energy production, replacing the use of inefficient traditional wood fuel with modern bioenergy. On the other hand, increased adoption of bioenergy can support increased food production through irrigation, post-harvest handling among other stages of the value chain, thereby helping to tackle issues of food insecurity. The experience of EAREP shows that there is need to promote and adopt technologies that convert biomass into finer products of high value in order to make the use of bioenergy more attractive. Additionally, the biomass-based value web approach can be pursued to increase food security through bioenergy plants. This requires integrating and harnessing the linkages between food value chains of different energy crops. Resultantly, increased energy and food production can be realised, for example, through processing cassava peels, material for growing mushrooms can be obtained, plantain biomass can be transformed into traditional flour and other bakery products, and bamboo leaves can also act as feed for livestock. Ms Nyanzi noted that in order to realise the much-needed food security through bioenergy plants, there is need to increase financing to support the adoption of bioenergy technologies for biofuels such as ethanol and biogas. Currently, the majority of the funding is directed towards other renewable energy sources such as solar and yet a greater proportion of the population in Africa is dependent on biomass.

Session 3: Bioenergy reporting and statistics in Africa

The session opened with a live poll question, “*where do you see the largest lack of data and data quality issues related to bioenergy in Africa?*”. The majority of participants noted that the largest lack of data and data quality issues were in sectoral traditional bioenergy consumption, sectoral modern bioenergy consumption, and the impact of bioenergy consumption on health. Meanwhile, no participants said that there was no lack of data or data quality.

This session provided a platform for the speakers from the respective countries to share their experience on bioenergy reporting and was moderated by **Mr. Jean Yves Garnier**, International Energy Expert, France. He emphasized the need for a clear distinction in the definitions of bioenergy and modern bioenergy, up-to-date statistics in the development of bioenergy as well as harmonisation of the data reported across Sector players.

Mr. Gbaty Tiadja Gbandey, Head of Information Systems and Regulation at the Ministry of Energy and Mines, Togo. In Togo, over 95 percent of domestic energy consumption is from traditional bioenergy as it is the most accessible source of energy, both physically and financially, for households and the main socio-professional categories. In 2010, the bioenergy sector employed over 850 000 thousand people, 90 percent of whose activities took place in the informal sector. The most recent study on the consumption of bioenergy at the domestic level was carried out in 2007 and allowed to establish consumption per capita and per year. He also showed the most recent data on the availability of biomass resources and the energetic balance between production and consumption. The experience in Togo has showed that there are difficulties in collecting bioenergy data because there are insufficient financial resources allocated to collection, the biomass sector remains dominated by the informal sector, and because there is a lack of a well-structured databases to facilitate data collection for years when there are no surveys. Mr. Gbandey therefore recommended that there is the need to put in place a real standardized methodology for collecting data on biomass.

Mr. Ian Kisawuzi, Statistician at the Ministry of Energy and Mineral Development, Uganda, shared the statistical bioenergy landscape of Uganda. Traditional bioenergy and modern bioenergy contribute about 73 percent and 13 percent to the total energy consumption, respectively. 84 percent of traditional bioenergy is consumed by the residential sector while only 15 percent of modern bioenergy is consumed by residential households. The major types of modern bioenergy used in Uganda include biogas, biofuels, decarbonised briquettes, firewood and charcoal using improved cooking stoves. Other types of modern bioenergy used by households include solar energy, hydro power, diesel generators, and wind turbines. Modern bioenergy used in other sectors includes bagasse for cogeneration in the sugar industry, and biogas produced from wastewater distilleries. An energy demand model is used to estimate the aforementioned statistics on energy consumption using the available baseline survey data for energy consumption computed for five years.

In order to estimate the fuel wood resources in the country, projections are done after a survey on bioenergy resources has been carried out. Additionally, specific surveys targeting charcoal production are undertaken in Uganda; the last National Charcoal Survey took place in 2015. Suffice to note that the over reliance on wood fuels as the main source of energy for heating, cooking and lighting is likely to continue for a foreseeable future due to the expensive alternative solutions such as electricity and Liquefied Petroleum Gas. The main challenges faced in bioenergy data collection include informal biomass trade, which limits the administrative data on the trade; absence of licensing, labelling or certification of biofuel technologies; and inaccuracies in estimation of traditional bioenergy usage by rural households; and high costs required to undertake surveys. Mr. Kisawuzi suggested that capacity building on estimation of bioenergy supply and consumption data as well as

creating working groups to coordinate stakeholders in the bioenergy industry are critical to improving the bioenergy reporting situation in Uganda.

Mr. Jean Marie Badiata Kayembe, Head of Households and Biomass at the Ministry of Energy, DR of Congo presented the experience in DRC. The shares of bioenergy both in the country's total consumption and in the residential sector are very high, respectively 93 and 99 percent. As for the consumption of modern bioenergy, it is difficult at the moment to take it into account in the energy balance, all the conditions not yet being met for a rigorous collection of this type of bioenergy, principally due to the fact that companies do not make them available to others and because of the inconsistency between different data sources. However, it is expected that in the coming years, modern bioenergy will take an important part in data collection given its increasing weight in final consumption. The main difficulties encountered in collecting data on traditional bioenergy were noted as the lack of reliable, regular, validated and centralized statistics; the informality of the biomass sector, which renders the data hypothetical; and the scattered and contradictory data depending on the sources. To overcome some of the challenges in collecting data on traditional and modern bioenergy, Mr. Kayembe suggested that the State should enact laws facilitating data collection; and that suppliers create websites for the popularization of their data.

Ms Nolwazi Innocentia Khumalo, Senior Energy officer, Energy Data, Planning and Economy, presented the Eswatini experience in bioenergy data reporting. Biofuels and wastes are the main fuels in the country's energy mix. Local electricity is generated from hydro and biomass sources of which 70 percent of the total electricity is produced. A biomass estimation tool is used to measure the available biomass resources and this takes into account the percentage of households in the urban and rural areas that use wood for cooking and heating as well as the respective quantities consumed. Currently, 70 percent of rural households and 9 percent of urban households respectively use wood fuel for cooking, while only 0.13 percent of households use charcoal briquettes for cooking. Wood chips and bagasse from the sugar industry form the most common bioenergy sources of industry energy use.

Eswatini has put in place supporting Energy Policies; National Energy Policy, 2018 and the Kingdom of Eswatini Energy Master Plan 2034 and is looking into eliminating unsustainable sources of energy in the residential sector. The major challenges noted in bioenergy reporting include the fact that traditional biomass is currently not traded which makes it difficult to estimate these quantities, other types of bioenergy such as energy crops, wood waste charcoal briquettes are not quantified which makes reporting difficult. Ms Khumalo noted that in collaboration with the World Bank, the country is conducting a household energy survey to quantify bioenergy demand across all sectors, establish the impact of bioenergy on forests in the country, and create a GIS database for rural energy access. Other future bioenergy prospects include the introduction of a 10 percent blend of ethanol in petrol for the transport sector, roll out of biogas digesters using cow dung in households, and the development of strategies for fuel switching opportunities from kerosene to LPG.

Day 2 – Wednesday 17 March 2021

Dr. Maria Michela Morese welcomed participants to day 2 of the Eighth Bioenergy Week, giving a recap of the previous day's activities.

Session 4: Sustainable bioenergy as a contribution to land conservation and restoration.

Dr. Maria Michela Morese launched a live poll to stimulate the discussions on the thematic area of the session. In response to the live poll question, *“how aware are you of the contribution that sustainable bioenergy can make to land conservation and restoration?”*, the majority of participants were quite aware and very few totally unaware of the thematic area.

This session was moderated by **Ms. Joan Cuka Kagwanja**, Chief, Agriculture and Business Enabling Environment (ABEEE), Private Sector Development and Finance Division, UNECA. Representatives from different African countries, research institutes and private sector representatives shared their experiences.

Mr. Berhane Kidane, Ethiopian Environment and Forest Research Institute, could not present at the meeting due to ill health but shared his PowerPoint presentation that discusses the sustainability of biogas and solid biomass value chains in Ethiopia.

Dr. Phosiso Sola, ICRAF, shared the experience on cross-border charcoal trade and its implications for sustainable wood fuel value chains in Africa. Wood fuel remains the main source of energy for cooking and heating in many parts of Sub-Saharan Africa, with about 17 percent of wood converted to charcoal. Sustainable production and trade of charcoal within the broader forest-agriculture landscape is critical given the insatiable demand for charcoal. As of 2019, the value of global charcoal exports stood at USD 1.29 billion, of which 53.7 percent was from Asia, 27.9 percent from Europe and 6.5 percent from Africa. Indonesia is the current leading exporter of charcoal, while in Africa, Nigeria, Democratic Republic of Congo, Ghana, Tanzania, Zambia and Uganda dominate charcoal exports.

There is an increase in cross-border charcoal trade in Africa as some countries outlaw charcoal production and impose logging moratoriums thereby shifting charcoal supply basins. Some of the supply basins are threatened and already degraded as a result of deforestation and the impact extends beyond international borders. This calls for strengthening strategies and regulatory frameworks guiding wood fuel value chains in Africa as well as increased engagement of stakeholders at regional and continental levels to harmonise policies on wood fuel management.

Ms Rocio A. Diaz-Chavez, Deputy Director for Research and Energy and Climate Change Leader, Stockholm Environment Institute (SEI), Africa Centre, presented on the Sustainability assessment of two key bioenergy pathways in Kenya using the GBEP Sustainability Indicators: Pathway one – use of sugarcane bagasse briquettes in the tea industry; and Pathway 2 – household use of charcoal produced on woodlands and farmlands.

The main findings from Pathway 1 were as follows: The use of sugarcane bagasse contributes to Green House Gas (GHG) emission reduction especially given that the tea industry is energy intensive; sugarcane bagasse provides an alternative source of bioenergy and tea industries are keen to utilise it, however, they require an improvement in their boilers. There is potential for replicability in other companies such as vegetable oil companies, food tanneries, albeit the existing challenge of transportation of the briquettes due to associated GHG emissions.

Under Pathway 2, it was noted that: there is need to clearly define woodland and farmland; some tree species like acacia are over used which has a long-term impact on their sustainability; the price of

charcoal affects the choice of food baskets; and following the ban on charcoal production in 2018, much of the charcoal is still imported from Uganda. Overall, simple but improved value chains with aggregation may have better sustainability results for the Global South. Landscape governance is equally important to balance power, enhance collaboration and decision making in natural resource management, and ultimately increase the benefits for all stakeholders along the value chain.

Dr. Cisco Aust, Project Manager, GIZ, shared an experience from Ghana. Dr. Aust highlighted the high deforestation and degradation rate in the country, with over 1.17 million hectares lost since 2000. Given that fuelwood and charcoal are the major drivers of forest degradation, GIZ is implementing a project with ten communities that are charcoal production hotspots in Ghana in a bid to promote forest landscape restoration. The objectives of the project are: to improve the sustainability of fuel wood harvesting by establishing woodlots and forest rehabilitation/agroforestry; increase efficiency and decrease the demand in the utilization of fuelwood by implementing improved kilns for the charcoal production and encouraging the use of clean cooking stoves; and strengthen national forestry conservation Policies to support the achievement of Nationally Determined Contributions (NDCs). The project has so far evidenced that woodlots compete with free logging within natural forests and so there is a need for strengthening law enforcement and the value of standing trees. Furthermore, lack of incentives and awareness on the value of forest conservation has accelerated deforestation.

Mr. Meshack Muga, FAO Kenya, made a presentation on the sustainable bioenergy and reforestation experience in Kenya. The country's forest cover stands at 7.4 percent, which is below the 10 percent constitutional requirement. Major sources of biomass energy include wood fuel, charcoal and agricultural waste, of which wood fuel accounts for over 70 percent of total energy consumption. The bioenergy supply-demand gap has increased due to the increasing population, urbanization, high energy prices and the current Moratorium by the Government of Kenya on charcoal production.

A number of barriers to the sustained production and utilization of bioenergy were highlighted and these include: low adoption of woodlot systems for wood fuel production in addition to the limited use of improved production and utilization technologies; lack of awareness on national standards for bioenergy products (charcoal and briquettes) coupled with lack of harmonised policies for promotion, production and utilization of bioenergy products; and unclear financial instruments supporting enterprises in the wood fuel value chain.

Suffice to note that reforestation remains a priority for the Kenyan Government with supporting Policies and frameworks put in place. Additionally, several reforestation initiatives are being implemented within the country such as the Trillion Trees in Kenya, Kenya Agricultural Carbon Project in Bungoma and Kisumu counties and the Tupande Pamoja Initiative. In order to consolidate efforts of these initiatives, there is need to fast track the enactment of the National Forestry Policy to reverse the pace of deforestation and forest degradation; inclusion of all relevant stakeholders right from the planning phase as well as incorporating community livelihood support is equally important. More impact can be realised from landscape approaches that take into consideration State or Community forests.

Mr. Pragnesh Mishra, Abellon Clean Energy, Ghana, presented on pellet production in Ghana. Abellon has undertaken research on over 130 various species of biomass sources that form the selection for pellet production. The company established a state-of-the-art pellet manufacturing facility in Ghana in 2012, with a capacity to utilise 60 000 tonnes of wood-based residues to generate energy for self-reliance. The value proposition is to provide a sustainable approach for efficient biomass and waste utilization using improved feedstock such as pellets and briquettes. Wood waste and residue sources include forest residues as well as small and large sawmills. Some of the notable

challenges in pellet manufacturing include: maintaining the established quality standards; limited funding for improved feedstock projects as well as the low affordability of pellet technology; diversity and geographical spread of biomass availability; and seasonal variation in the biomass supply, among others. These challenges have been solved by increasing awareness on the income and employment opportunities from waste; attaching value to waste to act as an incentive for the locals to ensure that they supply quality raw materials; adoption of a decentralized biomass collection model coupled with partnerships with organised players in biomass processing; and encouraging agroforestry focusing on bamboo as an alternative energy crop.

[Ms Lucky Dissanayake](#), Biomass Group Sri Lanka, [Mr. Dennis Garrity](#), Global EverGreening Alliance and **Mr. Bah Saho**, ECOWAS/ECREEE, made a joint presentation on the agro-forestry practices using *Gliricidia* to increase sustainable food and energy access. (Sri Lanka and West Africa Case Studies). *Gliricidia sepium* is a fast growing, nitrogen fixing short-rotation coppicing tree that grows almost throughout Sri Lanka and vast areas in Africa. The plant requires a maturity period of 18 months with potential to coppice the branches every 6-18 months for fuel wood, (depending on rainfall availability) while the tree trunk and roots store nitrogen to keep the soil fertile. The trees can remain in existence for over 50 years thus forming a good long-term carbon sink. Biomass Group contributes to the achievement of about 7 SDGs and follows an out-grower business model where smallholder farmers are encouraged to grow *Gliricidia* along their farm fences and intercrop it with cash crops to form the supply base. To date, the company has registered over 40,000 farmers who grow about 500-2000 trees depending on their size of land. The intervention has led to a reduction of 75.4 ktCO₂/y in emissions as biomass replaces furnace oil and 377 tCO₂/y in emissions as biomass replaces kerosene. Mr. Dennis Garrity, emphasized the importance of leguminous shrubs such as *Gliricidia* in agriculture and biomass energy production. In Sri Lanka, where *Gliricidia* is the fourth largest planted tree crop, the harvested wood is sold to small scale power plants as well as industrial power plants of about 5-15MW. The *Gliricidia* shrub can potentially be grown across Africa and provides an excellent source of biofertilizer and fodder for animals. Kenya and Malawi are massively scaling up the use of the Shrub through intercropping to reverse soil degradation and increase maize production for better food security. The Global EverGreening Alliance now seeks to fully commercialise *Gliricidia* production to biomass electric power generation to realise an evergreen energy system in the rural areas across Africa. This calls for increased Government attention to harness the underlying potential.

Mr. Mangola Bleza, Ministry for the Environment and Forestry Resources, Togo, gave a brief speech on the experience of Togo. He noted that traditional solid biomass represents over 95 percent of domestic energy consumption. The balance between sustainable supply and demand for wood energy will be very low from 2030 and the sustainably exploitable supply will only be able to meet 28 percent of demand. He emphasized the conclusions of [Mr. Gbandey](#) that the data are scarce and updated infrequently; in order to fully understand the impacts of bioenergy, these data need to be more consistent. He also highlighted to need to improve bioenergy production efficiency, especially in the case of charcoal, where the efficiency can be as low as 10 percent.



Figure 2: Interactive Slido word cloud.

The majority of participants indicated biogas to be the most promising bioenergy technology in their countries. Other promising technologies include 2G ethanol, bioethanol, municipal wastes, sustainable charcoal and biomass CHP, among others.

Session 5: Liquid biofuels in urban areas

Dr. Maria Michela Morese launched the Session with a live poll to guide the discussions of the Session. In response to the live poll, the majority of the participants revealed that liquid biofuels are used in urban areas within their respective countries.

The session was moderated by **Prof Suani Coelho**, USP, Brazil, who made the first presentation on the Brazilian experience of using liquid biofuels in urban areas. In Brazil, the use of liquid biofuels takes an important role in the road transport fuel mix, with 29 percent of the fuel sourced from ethanol and 14 percent from ethanol blend in gasoline. Brazil is the second largest producer of ethanol, and in the last season realised a production of about 34 million m³, with 95 percent sourced from sugarcane and 5 percent from corn. In terms of biodiesel production, soybean oil accounts for 68 percent of feedstock, 14 percent animal fat and 18 percent from other sources such as residual oil. With 10 Mha of harvested sugarcane area, 34 million m³ of ethanol are produced, 30 million tonnes of sugar, and 36.8 TWh of electricity generated, which corresponds to about 6 percent of the total electricity supply. The increased use of ethanol in vehicles translates to a reduction in carbon emissions of 50 percent, in addition to reduced mortality as a result of air pollution.

Prof Thomson Sinkala, Chairman, Thomro Biofuels, Zambia, presented on the Ethanol production business in Lusaka. The company currently uses maize, cassava and molasses as feedstock for ethanol production, however, sorghum, cattail and mango waste also present potential sources of feedstock for bioenergy production. Thomro Biofuels operates a distributed production business model that allows for establishment within the farmers to reduce the overall cost of production. The company is licensed to produce about 15 million litres of ethanol/year. Other companies currently licensed to produce bioethanol in the country are Zhongkai International producing about 20,000 l/day and Surya biofuels with current ethanol production capacity of 5,475,000 l/y. Ethanol production in urban areas presents good potential but there is need to appoint bioethanol champions within African countries and at global levels to drive its increased use; establishment of financial instruments that can be leveraged by local companies is critical to increasing investment in the bioethanol value chain.

Mr. Seungwoo Kang, Associate Programme Officer, IRENA, shared the findings of a study undertaken by IRENA on the sugarcane bioenergy potentials in Southern Africa (SA). The sugar industry in SA is a well-established industry in the region but mainly for food production, and to a smaller extent for energy production. Sugarcane presents one of the most efficient means for solar energy conversion to biomass. Ethanol produced from sugarcane can reduce GHG emissions by up to 80 percent compared to gasoline and one tonne of sugarcane contains about the same amount of energy as 1.2 barrels of petroleum. Some of the ethanol projects in SA include:

- Biocom in Angola established in 2014, with 42 kha of sugarcane planted area to produce ethanol equivalent to 30 million l/y;
- In Malawi ethanol (E10) blended with gasoline has been in use since 1982, mainly to fuel cars and the ethanol is produced using sugarcane molasses from local mills. The country is now moving towards E20;
- In Mozambique, the Clean Star project was established in 2012 to produce ethanol from cassava in a bid to reduce deforestation.

Over 500 million ha have been devoted to sugarcane growing within 7 major sugar-producing countries and approximately of 35 million tonnes of sugarcane are harvested annually with only 4.1 million litres of ethanol produced. Biofuels can provide readily available alternatives for decarbonising the transport sector to complement the existing electrification role, however, barriers such as technology, cost-competitiveness, finance, infrastructure, end-use applications (blend limits) and sustainability need to be addressed to promote a vibrant ethanol production industry.

Mr. Ed Agnew, Koko Networks, presented the experience of Koko networks. The company operates in East Africa and India with their major product line focused on clean cooking solutions. Cooking fuel presents a USD 40 billion market potential in urban Africa. Koko networks operates a technology-driven business model to enable the distribution of liquid bioethanol as an alternative to the conventional fuels mainly used within East Africa. Through partnerships with existing fuel providers such as Vivo energy in Nairobi, bioethanol is delivered to existing fuel depots and transported to last mile users using Smart Tankers. Small bioethanol ATMs have also been installed within agent kiosks and customers also have an option to purchase modern ethanol cookers connected with smart cannisters. Customer payments can be done using mobile money which is an already established payment mechanism within the country. Underpinning the Koko supplier network is a technology-based platform that enables the company to dispatch drivers and track fuel levels in real time, thus making the system cheaper and more efficient, while providing an extra source of income for the company agents. Koko currently has a network of 700 agent shops, 10 shell stations and micro-smart tankers across Nairobi providing access to bioethanol to over 6 million Kenyan customers.

Session 6: GBEP Youth Award

Ms Constance Miller, GBEP Secretariat, made a presentation on the involvement of Youth in GBEP activities and bioenergy in general. GBEP is committed to involving youth in its activities through relevant capacity building initiatives and recognising important research work of the youth in the field of bioenergy. This is made possible through a dedicated webpage on the GBEP website and the issuance of the annual GBEP Youth Award. Some of the existing Youth engagement initiatives include collaborations with the Youth and United Nations Global Alliance (YUNGA) to develop educational materials for the youth on bioenergy related matters. In 2021, the Bioenergy Supplement will be launched as a contribution to the YUNGA Energy Challenge Badge. The Energy Challenge badge focuses on children between the ages of 5 and 16 years, and provides educational material on bioenergy, its production, use and how to ensure its sustainability. The aim of the Energy Challenge

Badge is to stimulate behaviour change and get more youth thinking about how they can increase their contribution to renewable energy use. To obtain the Energy Challenge badge, eligible youth must complete dedicated activities that get them into thinking and acting on their role in the bioenergy sphere.

The GBEP Youth Award was launched in 2020 to recognise the most remarkable and outstanding research work carried out by University students in the field of bioenergy. On an annual basis, the focus of the GBEP Youth Award is in connection with the regional host of the Bioenergy Week, and in 2021, the focus of the GBEP Youth Award was Africa. An annual call of papers is published on the GBEP website to which Youth respond with submission of a poster summarising their research.

The 2021 GBEP Youth Award was presented to [Ms. Lilian Motongori Jamunga](#), a Bachelor's graduate with research focusing on the design and fabrication of a peddle driven village-based biodiesel reactor for production of biodiesel from non-edible oils. Ms. Lilian expressed her gratitude for being selected for the award and shared her research work. The project is part of an ongoing program for Matangwe Community Health Centre based in Bondo, Kenya to produce biodiesel using the batch process. The reactor uses power from a treadle sewing machine to run a turbine stirrer in mixing yellow oleander oil as a component of production. The biodiesel reactor can mix components in 6.4 minutes, producing about 11.25 litres of biodiesel when manually driven and has an estimated budget cost of USD 56. The biodiesel reactor is recommended for people in rural areas without access to electricity and may provide an extra source of income from the sale of biodiesel.

Day 3 – Thursday 18 March 2021

Dr. Maria Michela Morese welcomed and thanked the participants for their continued commitment and involvement in the discussions of the three-day Eighth Bioenergy Week.

Session 7: Bioeconomy Opportunities in Africa

Dr. Morese launched a live poll to in relation to the thematic area of the session. In response to the live poll question, “*how well do you think the principles of bioeconomy are applied in your country?*”, the majority of the participants responded that the principles of bioeconomy were not well applied in their respective countries, which indicated the need for more efforts from country Governments on this front.

This session was moderated by **Mr. Monga Mehlwana**, Energy Infrastructure and Services, Private Sector Development and Finance, ECA. He made a keynote speech where he highlighted that as a result of the COVID-19 pandemic, ECA estimates that for the first time in 20 years, Africa’s GDP contracted to between 2-5.4 percent due to low economic activity. Nonetheless, this presents an opportunity to build back more resilient and sustainable economies that are cognisant of the environment. Fossil-based economies are unsustainable and are not reliable in the Post-Covid era, especially in the long-term. Bioeconomy charts a new path of economic growth eliminating the use of fossil fuels while focusing on the use of biological renewable resources to produce food, energy and improve livelihoods. The food-fuel competition needs to be managed efficiently, striking a balance between energy demand and food production since most of the bioenergy crops are not food crops. Policy support and regulatory frameworks are equally important to rally political support for the bioenergy investments. The transition into a vibrant bioeconomy also calls for increased domestic resource allocation by host Governments for the development of the bioenergy sector and this can be accompanied by the appointment of champions especially from the Private Sector, to rally increased support for bioeconomy and increase its visibility.

Mr. Peter Kinithua, Energy Division, Department of Infrastructure and Energy, AUC, shared the lessons learnt from mainstreaming modern bioenergy development in Africa (2012-19). The process of mainstreaming modern bioenergy development in Africa has been a joint implementation initiative between AUC, ECA and NEPAD that started in 2011 with the conceptualization and development of the policy options for bioenergy development in Africa as well as the technical and economic assessment of biofuels. This then translated into the Africa Bioenergy Policy Framework and Guidelines and these were consequently adopted at Summit level by the African Union Heads of State. From this process, they have learnt that modernisation of bioenergy development is a process which involves multi-sectoral and multi-disciplinary stakeholders whose needs must be harmonised in order to realise the intended objectives. Moreover, there is need for anchor Regional institutions that can help to coordinate and steer the bioenergy development process; in this context, Regional Economic Communities (RECs), Regional Centres for Renewable Energy as well as the respective Energy departments have a key role to play as anchor institutions. Mr. Kinithua also noted that modernising bioenergy helps to reduce the gender inequality gap by creating more green jobs for women and girls but that there is need to increase the Bioenergy data collection capacity of AFREC to maintain up to date data sets on which Policy decisions can be based. He also highlighted that most project developers are small and medium sized enterprises that face financial challenges in the process of implementing their bioenergy projects especially at take-off stage.

Mr. Boikie Mabowe, Managing Director, Biodiesel Botswana, Gaborone, presented on the opportunities for generating diesel from animal fat in Botswana. Botswana imports all its fossil-based

petroleum fuel requirements, mainly from South Africa. National biodiesel production, therefore, presents an opportunity to develop a sustainable fuel source in the country. The Government of Botswana is putting in place supporting Regulatory Frameworks such as the draft Energy Policy that advocates for the increased use of renewable energy sources, as well as engaging Consultants to develop Biofuel Guidelines and National Biofuel Standards to support biofuel production.

Biodiesel Botswana utilises used cooking oil and animal fat as the feedstock for biodiesel production. The company projects to commence operations in 2022 with a target biodiesel production capacity of 5,000 l/day, although these estimates are projected to grow exponentially when the blending ratio of B10 is adopted. Other planned products include high quality glycerol and bar soap. The company noted the need for increased government support to biodiesel production by fast tracking the approval of Regulatory Policy Frameworks as well as access to expansive land to grow energy crops for a sustainable feedstock base. Access to affordable financing is equally important to allow for scaling.

Prof Thomson Sinkala, Chairman, Thomro Biofuels, presented on the integrated phytomining and Ethanol Production in the Zambian Copperbelt. Globally, dumps usually occur in mining areas and in the Zambian Copper Belt alone, the dumps cover more than 30,000 ha. Whereas mining activities are carried out in a small area, the dispersion of pollutants takes place on a wider scale, thereby exacerbating pollution (water, air, soil, food). In Zambia, hyperaccumulator plants have helped to absorb the high concentrations of metals, consequently reducing the potential damage to the environment. Water hyacinth and cattail represent good examples of hyperaccumulator plants and can support Phytoremediation initiatives. It is important to first add value to the plants before extracting minerals.



Figure 3: Interactive Slido word cloud.

Participants highlighted the following words to best describe bioeconomy: Circular economy, Sustainable growth, Energy-Food Nexus, and holistic approach.

Session 8: Discussion in break-out groups of the Outcome Document of the Bioenergy Week

The group discussions were moderated by **Mr. Monga Mehlwana**, UNECA, **Mr. Rashid Ali Abdallah**, AFREC/AU, and **Mr. Yagouba Traore**, AU. The discussions were aimed at enriching the draft Outcome Document of the Bioenergy Week. During the discussion, lack of information and

misinformation on the impact of bioenergy, particularly biofuels on food security, health and deforestation, and lack of investment were noted as some of the limitations to modern bioenergy development. Furthermore, access to affordable financing to allow for scaling modern bioenergy investments especially those at proof-of-concept level was emphasized. Inputs from the break-out groups were collected with a view to reflect them into the final Outcome Document ([EN](#), [FR](#)).

Session 9: Roundtable discussions – Bankability of bioenergy projects: Challenges and Opportunities

Dr. Maria Michela Morese launched the session with a live poll question, “*What are the main challenges encountered in creating bankable projects for Bioenergy in Africa?*”. The majority of the participants noted the issue of misunderstanding within financial institutions that are meant to cover bioenergy projects, lack of institutional coordination, and lack of awareness of financial opportunities as the main challenges to the creation of bankable bioenergy projects.

The session was moderated by **Ms Meghan Sapp**, Managing Director, PlanetEnergy.

Mr. Brian Healy, U.S Grains Council, made a presentation emphasizing the need for building coalition within the renewable energy sector to improve the bankability of bioenergy projects. In order to fully realise the benefits of bioenergy policies, strong partnerships between the private industry groups such as USGC as well as GBEP and the respective Government Ministries are very critical. The existence of supporting bioenergy policies feeds into the access to finance component. Countries such as the US, Canada and Brazil, which have implemented renewable fuel policies, have seen an increase in their biofuel production. This goes to say that policies play a catalytic role in production and access to supporting finance mechanisms for expansion. He further noted the following factors that continue to drive policy for biofuel use: agricultural producers for countries with substantial feedstock production; the associated environmental benefits such as decarbonisation, GHG emission reduction resulting from the implementation of biofuel policies; human health benefits as a result of reduced air toxin emissions and the economic benefits that accrue to rural agricultural communities in terms of foreign exchange.

Mr. Flavio Castellari, APLA, Brazil, presented on the role of bioenergy and diversification for a sustainable sugarcane industry in Brazil. Africa is one of the major markets for the Brazilian sugarcane sector. The Brazil sugarcane industry has evolved over the years from simply producing sugar to manufacturing other products such as ethanol, biogas and bioelectricity, and this diversification in product catalogue has enabled the Brazilian sugarcane industry to thrive and even access supporting financing for expansion. The diversification principle is also applied to the Brazilian energy matrix of which sugarcane accounts for 18 percent, and this justifies the importance of the sugarcane industry in Brazil’s energy mix. One tonne of sugarcane can produce about 250 kg of bagasse and 200 kg of straw, which form important components in electricity production, and the surplus of which can be exported to the national grid. Diversification plays an important role in ensuring sustainability whereby the revenue generated from production of both ethanol and sugar is more than what would be realised from focusing only on sugar production. The prospects for the Brazilian sugar industry are to establish more bio-refineries.

Mr. Dario Giordano, Versalis, shared his experience on key enabling factors for advanced biofuels industrial deployment. Versalis is a chemical company under the Eni group, with about 14 plants in Europe. Over the years, the company has developed experience in cellulosic conversion using ‘Proesa’, a proprietary technology used to produce fermentable sugars/bioethanol from

cellulosic feedstock. In 2020, Versalis started the production of ‘INVIX’, a bioethanol-based disinfectant at its Crescentino site. The plant also has a section for ethanol production using 2G feedstock, biogas generation sections and a green energy production section. The Proesa technology is versatile and can produce cellulosic ethanol and other chemical components. The utilization of lignocellulosic feedstock presents an opportunity for sustainable development of bioenergy since the residues do not compete with food production. Proesa technology can also be replicated in many developing countries that have vast biomass resources and allows for better biofuel production with reduced GHG emissions. Although advanced biofuels present a lot of business opportunities, there is need for clearly defined supporting policy guidelines for the production of advanced biofuel as well as the requisite financing.

[Mr. Chris Sim](#), E4Tech, made a presentation on understanding the replication potential of bioenergy for commercial and productive uses. The presentation was based on the BSEAA Project (Bioenergy for Sustainable Local Energy Services and Energy Access in Africa) undertaken by E4Tech, to analyse the commercial opportunities and constraints for bioenergy development in seven demand sectors (technology supply chains, biomass, business models, economics, institutional, market and regulatory frameworks). The project focused on electricity produced from combustion technologies and covered Nigeria – Cement sector, Ghana -Palm oil effluent, Kenya – part replacement of fuelwood with sustainable biomass residues for heat in tea processing, as well as the use of residues from the horticulture and sisal sector, and Tanzania – use of wood residues from the wood processing sector. A supply chain archetype matrix was developed to guide the understanding on the supply of the feedstock vs internal energy demand. Some of the key findings of the study include: the availability and quality of feedstock is not much of a problem, provided there are aggregation systems in place and there is clarity on ownership of the feedstock; technology is rarely a limiting factor, especially for combustion-based CHP although more local adaptation of international AD technology would help to enhance the economic case; and in all cases, there is need for a transparent enabling environment to market the surplus electricity from small-scale producers using attractive Feed-in Tariff plans. Important to note is that bioenergy in Sub-Saharan Africa is highly constrained by unsupportive and/or poorly enforced policies, and requires stronger government action particularly to support grid electricity exports by small bioenergy-based power producers.

[Mr. Alberto Borello](#), Secretary General, Southern African Biogas Industry Association (SABIA), presented on the experience of SABIA in supporting biogas projects. South Africa currently has about 30 MW of biogas plant capacity, of which 1,200 MW are feasible within a 5-year period. The South African biogas industry has the capacity to reduce GHG emissions by 2-15 percent if much of the organic waste is converted into biogas. Some of the biggest potential biogas production opportunities are presented by: municipalities that are implementing the ban on food waste entering landfill sites; municipalities that are pushing to buy electricity from Independent Power Producers such as the Cape Town Municipality; private industries that are looking to become self-sufficient to reduce incidences of load shedding; and micro digesters in rural areas that are supported by the Government.

The major drivers for the development of industrial biogas plants are: the need to supplement electricity from the national grid since it is difficult to procure; unavailability of methane for industrial use in some regions of the country; the potential of biogas industry in reducing GHG emissions; and the opportunity to reuse waste produced by food processing industries.

Conclusions and Closing Remarks

Dr. Maria Michela Morese, Executive Secretary, GBEP, concluded the three-day event conveying her appreciation to FAO, UNECA, AU-AFREC, US Grains Council and the GBEP Secretariat for the collaboration in organising a successful virtual 8th Bioenergy Week. She further thanked all participants for their active engagement in the discussions throughout the event. Her concluding remarks emphasised the fact that the Global Bioenergy Partnership provides a unique forum through which governments, international organisations and other stakeholders can unite to enhance the use of bioenergy as a tool for sustainable development. The last fifteen years of GBEP's existence have supported the advancement of bioenergy for sustainable development, climate change, mitigation, and food and energy security, while providing a platform for sharing best practices and successful case studies on the use of bioenergy. This is especially on account of the growing global production and use of bioenergy as countries seek to guarantee energy access, diversify energy sources to promote economic development, energy security and environmental sustainability. This Bioenergy Week focused on how to foster sustainable bioenergy production and deployment as well as designing effective policy frameworks taking into consideration the existing GBEP Sustainability Indicators. The discussions also contributed to the enriched understanding on how to meet the energy needs of different countries in Africa, which is key in developing a vibrant modal bioenergy sector for sustainable economic growth and rural development on the continent.

Mr. Rashid Ali Abdallah, Executive Director, AU-AFREC, also extended his appreciation to all speakers, moderators and participants for their active engagement during the Bioenergy Week. He also commended the smooth coordination of the event organisers and further emphasized the fact that the Outcome Document of the 8th Bioenergy Week reflects the rich experience that has been built over the years and provides a roadmap for the effective development of the bioenergy sector in Africa. Bioenergy data and statistics are critical for decision making, thus the need to improve and harmonise the statistical reporting at all levels. Institutional and human capacity building programmes focusing on bioenergy are equally important. He concluded with the proverb that, *“If you want to go fast go alone, but if you want to go far, go together”*, thus calling for continued collaboration of Partners in the development of Africa's bioenergy sector.

Mr. Robert Lisinge, Chief, Energy, Infrastructure and Services Section, ECA, emphasized the fact that the biomass landscape in Africa needs radical transformation to allow for energy diversification and productivity, and the overall economic development of the continent. There is need to harness the available bioenergy feedstock resources coupled with cutting edge technology to ensure that bioenergy plays a key role in advancing the clean energy agenda in Africa. Bioenergy is set to play a bigger role in the post-COVID recovery era. Bioenergy, as part of the bioeconomy, promotes responsible low-carbon energy development and positively impacts other sectors such as water, health, food and land. He called for a clear roadmap for implementing the agreed Action Plan of the 8th Bioenergy Week in order to be able to report on the progress made in the subsequent Bioenergy Week.