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

GBEP 7th Bioenergy Week - Summary

Manila, Philippines, 25-27 June 2019

The seventh Bioenergy Week of the Global Bioenergy Partnership (GBEP) was successfully held from 25 to 27 June 2019 in Manila, Philippines, 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 kindly organized by the Government of the Philippines, in particular by the Department of Energy (DOE), the Department of Agriculture (DOA) and the Sugar Regulatory Administration (SRA), in collaboration with the Ethanol Producers Association of the Philippines (EPAP), US Grains Council and Novozymes. It has been supported by and organized in cooperation with GBEP and the Food and Agriculture Organization (FAO). The event gathered approx. 250 participants from four continents; the participants included scientists and government officials, as well as representatives from the private sector and civil society organizations.

The event represented a follow up to the first GBEP Bioenergy Week held in 2013 in Brazil, the second Bioenergy Week held in 2014 in Mozambique, the third Bioenergy Week held in 2015 in Indonesia, the fourth Bioenergy Week held in 2016 in Hungary, the fifth Bioenergy Week held in 2017 in Ghana and the sixth Bioenergy Week held in 2018 in Argentina, with the latest two events as part of the second round of Bioenergy Weeks organized in different regions of the world. The Philippines event presented positive experiences and initiatives in the sustainable production and use of bioenergy that could guide the design and implementation of bioenergy policies in the interested region (Asia and the Pacific). Furthermore, it provided the opportunity to continue a dialogue with the private sector and stakeholders on ways to improve mutual cooperation towards a more sustainable production and use of bioenergy.

Day 1 – Tuesday 25 June 2019

Opening session

The seventh Bioenergy Week was opened with welcome speeches by Mr Robert B. Uy, Assistant Secretary, on behalf of Secretary Alfonso G. Cusi, Department of Energy, Philippines; Ms Tamara Palis-Duran, Assistant Representative of Food and Agriculture Organization of the United Nations (FAO) in the Philippines; and Mr Sérgio Taam, Chargé d'Affaires, Embassy of the Federative Republic of Brazil in the Philippines, representing the Co-Chair of the Global Bioenergy Partnership (GBEP).

Robert B. Uy, on behalf of the Secretary Alfonso G. Cusi, DOE, Philippines, expressed his sincere gratitude and welcome to participants, stakeholders and guests. The Philippines has a large agricultural economy with major crops such as rice, corn, sugarcane and coconut among others, generating large volume of residues that could be used as biomass to fuel power plants. The Philippines is considered as one of the leading country in terms of environmental sustainability in energy resources. In view of the Philippines' government commitment to promote renewable energy, the government of Philippines has released in 2008 the "Renewable Energy Act" (RA9513), which aims to accelerate the development of country's renewable energy resources by providing fiscal and non-fiscal incentives to private sectors, industries and equipment manufacture's suppliers. Under the National Renewable Energy Program for the period 2010 to 2030, they are foreseeing an increase of bioenergy capacity by 200 percent in the next 20 years, with the biomass sector forecasting to have an additional capacity of 830 MW within the period 2019-2040. He stressed the importance for the country's sustainable energy agenda to develop and utilize renewable energy resources to achieve energy self-reliance, mitigate climate change and promote social-economic development in rural areas. Mr Robert Uy recognised the importance of the GBEP Bioenergy Week as an opportunity to continue the dialogue with the private sector and others stakeholders on ways to improve mutual cooperation towards more sustainable production and use of bioenergy.

Tamara Palis-Duran expressed her pleasure that the 7th Bioenergy Week was taking place in Asia and the Pacific, as a number of economies in this region have large agricultural sectors, which generate unused residues which use for energy generation could play an important role in mitigating GHG emissions from agriculture, in diversifying energy access and in moving away from traditional fossil fuel energy. Ms Palis-Duran underlined the intrinsic link among agriculture, food security and rural development with climate change, energy access and use. In this regards FAO considers there is a need to transition to sustainable agricultural systems which are also 'energy-smart', to meet future food and energy challenges. Ms Palis-Duran went on to discuss the significant contribution that sustainable bioenergy could give to achieve energy-smart agrifood systems and the key role that GBEP plays in this mission. Not only FAO has been one of the founding partners of GBEP and is hosting its Secretariat, it has also been active partner in its programme of work, in particular in the development of the set of 24 GBEP Sustainability Indicators (GSI) used to guide policy-makers towards sustainable development paths.

Sérgio Taam, Chargé d'Affaires, Embassy of the Federative Republic of Brazil in the Philippines, talked on behalf of Brazil as Co-Chair of GBEP, expressed his appreciation for the fact that the GBEP Bioenergy Week was once more taking place in Asia, after the event held in Indonesia in 2015. Asia presents significantly favourable conditions for the development of bioenergy, as it is currently one of the hotspots for the global production and consumption of liquid and solid biomass. Many countries across the region have an important background in promoting the production and use of bioenergy. Recently, new important advances in bioenergy policies and regulatory frameworks have

been achieved in many countries within the region. Bioenergy is recognized as key to achieve the goal of SDG7. Access to affordable, reliable, and sustainable energy is fundamental to achieve social and economic development, health care and sanitation targets and eradication of poverty. Based on Brazilian experience the sustainable use of bioenergy can play a crucial role to reduce GHG emissions, by replacing fossil fuels, thus promoting socio-economic development and fostering energy security. The new Brazilian National Biofuels Policy (Renova Bio) is the Brazil's new national biofuels law that sets annual C reduction targets and incentivizes producers which contribute to achieve them. It will come into effect in Jan 2020. Brazil's experience has demonstrated that the sustainable deployment of sustainable bioenergy has several positives externalities: it favours energy security, stability and flexibility. Bioenergy can be stored cheaply and efficiently, without increasing emissions. GBEP has a key role and responsibility to promote sustainable bioenergy and this event is a great opportunity to share experiences and learn more about specificities of bioenergy in Asia.

Session 1: Global, regional and national policy

Senator Sherwin T. Gatchalian, Chairman Senate Committee on Energy, Senate of the Philippines, talked about the importance of bioenergy as part of the renewable energy policy in the Philippines. In particular, he explained that in the country there are two critical Republic Acts which addresses bioenergy: RA 9367/2006 and R.A.9513/2008. RA 9367/2006 makes the Philippines the first country in South East Asia to legislate the blending of biofuels in all petroleum fuels. It seeks to develop indigenous renewable energy (RE) to reduce dependence on imported oil; mitigate GHG emissions; increase rural employment; and ensure the availability of RE without detriment to the environment and food security. Implemented in June 2007, RA 9367 provides fiscal incentives to biofuels producers and distributors including income tax holidays, duty-free importation, VAT exemption for the sale of raw materials used for biofuels production, among others. The Renewable Energy Act or RA 9513/2007 aims to stimulate the entry and expansion of RE technologies including biomass. The government of Philippines (GPH) signed the Paris Agreement on Climate Change in February 2017. It has committed to reduce its GHG by 70 percent by 2030, but needs technical and financial support. Although all efforts, as of today biofuels cover just 1.5% of total final energy consumption in the Philippines. The major challenges for biofuels success in the Philippines derive from the lack of feedstock used to produce them and the higher price of local ethanol (16.32 PHP/L) compared to the imported one (53.54 PHP/L). As a consequence, a large rate of ethanol is imported (50.91 percent) mainly from the U.S. Almost all ethanol plants run with molasses, with 78 percent of total molasses in the country used for bioethanol production. For the future the GPH will diversify the feedstock for bioethanol production, by fostering sorghum and sugarcane utilization and to introduce new, more efficient technologies. Senator Gatchalian presented also all the other forms of bioenergy produced in the country, with a focus on biodiesel (for which imports are not allowed), biomass power generation from bagasse and rice husk and waste to energy (WTE). The last pathway still need a dedicated regulatory framework. To overcome the barriers in the bioenergy industry, the GPH will invest in R&D for sustainable feedstock supply and to improve processes for feedstock production; will pursue the implementation of RA 9513/2007 and will facilitate the approval of a WTE bill.

Nestor Arcansalin, Director of the Board of Investments, Department of Trade and Industry, the Philippines, addressed the participants on Bioenergy Regulatory Framework in Asian countries. He resumed the main RE laws, biofuels laws and mandatory use of biofuels in Philippines, Thailand, Indonesia, Vietnam, China, India, Japan and Australia. He highlighted that, although different countries have different regimes and regulatory frameworks, they have common objectives, such as to increase energy security, to reduce GHG emissions and to increase employment generation. Moreover, there are

key common factors for a successful bioenergy production and utilization in all of these countries, such as feedstock cost and reliability of supply; economic feasibility, cost and availability of competing energy sources; and support from local government, especially in terms of fiscal and non-fiscal incentives, mandates in place and financing. He concluded by empathizing the importance to build synergies among countries in the region in order to foster the sustainability of the bioenergy sector.

Rashid Ali Abdallah, Executive Director, AFREC, contributed through a pre-recorder presentation, in which he introduced AFREC and informed participants about the status of bioenergy in Africa. AFREC is an African Union Commission (AUC) specialized agency, launched in 2008 by the African Ministers of Energy. Its main goals are to develop sound policies, strategies and plans, and to recommend their implementation at country, regional and continental level. In order to achieve these final goals AFREC has to design, create and update an energy continental database and to facilitate rapid dissemination of information and exchange of information among Member States. AUC started working on bioenergy since 2010 and in 2014 the Africa Bioenergy Policy Framework and Guidelines has been issued, with a view to guide policies and regulations that promote a viable sustainable bioenergy sector at country and regional level. The African bioenergy sector is currently affected by low efficiency along the various steps of each different value chains and all of them need to be modernized. It is key to develop a Pan-African bioenergy coordinated and harmonized regulatory framework. As of today, in fact, just a few countries have bioenergy regulatory framework and, oftentimes, they are not put in place. Mr Rashid Ali Abdallah concluded by presenting the joint initiatives between AFREC and GBEP, with the objective to set up a strong system of continuous monitoring of the bioenergy sector in African countries, through the implementation of the GBEP Sustainability Indicators, with a view to propose tailored recommendation and policies for each country to improve the sustainability of bioenergy production and consumption.

Giulio Volpi, Energy Directorate General, European Commission, with a pre-recorded presentation gave an overview of the Renewable Energy (RE) policy of the European Union with a focus on bioenergy. He gave an update on the status of EU nations toward the achievement of the 20 percent RE target by 2020: he showed that EU is on track to reach its RE target, although some country need to step up its efforts. He showed the penetration of RE in the transport sector, where EU set a target of 10 percent by 2020, whilst the share achieved so far is still around 7.6 percent. He explained the main features of the new RE directive (post-2020), within which the EU has adopted more ambitious targets for 2030, such as 40 percent reduction of GHG emissions and a RE target of 32 percent. The last is one of the two main goals of the new RE directive, whilst the other objective is to make EU the global leader for RE technologies. Bioenergy will continue to play a significant role in the EU energy mix and EU has recently defined new sustainability criteria for it. These new criteria address biofuels for transport; the use of biomass and biogas in heat and power production; and for the first time new binding criteria have been included for forest biomass, to avoid unsustainable production of forest biomass and promote efficient technologies in the power sector. In the post 2020 legislation, new limits in the use of conventional biofuels in the transport sector have been introduced in order to limit ILUC risks. According to the new EU rules, the use of conventional biofuels should be gradually reduced towards 0 percent by 2030. Mr. Volpi concluded by presenting the EU long term strategy for a net zero C European economy by 2050.

Simone Landolina, Strategic Initiatives Office, International Energy Agencies (IEA) presented on bioenergy global perspectives, challenges and opportunities. He showed how global energy demand has changed from 2000 to date and the perspectives for 2040. In 2040, the global energy demand (and

related emissions) is expected to continue increasing, with emerging economies and developing countries as main drivers for it. The world is currently not on track to meet the main energy-related components of the Sustainable Development Goals (SDGs). The IEA's Sustainable Development Scenario (SDS) outlines a major transformation of the global energy system, showing how the world can change course to reach universal energy access (SDG7) while also achieving climate goals (SDG13) and reducing air pollutant emissions (part of SDG 3). In 2030 IEA's SDS GHG emissions will strongly reduce with the majority of savings coming from improved efficiency and renewables, and with minor contributions from other technologies (e.g. nuclear, CCUS, hydrogen). In 2018 IEA tracked the clean energy progress towards the achievement of IEA SDS in 2030. In relation to renewable electricity, only Solar PV and bioenergy were "on track", with electricity generation from bioenergy increased by over 8 percent. On the other hand, transport biofuels and bioenergy for heat were "off track", with accelerated deployment needed in both sectors. New policy impetus is needed to boost technology innovation and accelerate deployment to bring transport biofuels and bioenergy for heat on track with the IEA SDS. Biofuels will play a key role in energy transition and in the decarbonisation of long-haul transport modes: as of today biofuels consumption is mainly related to passengers' vehicles, but after 2030 the largest share of biofuels will be used for road freight, shipping and aviation, and in 2040 road freight, shipping and aviation will account for two-thirds of total biofuel consumption. The consumption of advanced biofuels is expected to accelerate after 2030 and to reach 40 percent of total biofuel consumption in 2040. Mr. Landolina concluded by emphasizing the following take home messages: modern bioenergy is the largest source of renewable energy today, and it represents the biggest renewable contributor to GHG emission reductions in the IEA SDS in 2030; bioenergy sustainability remains a corner stone and the work of GBEP is key with a view to look at integrated solutions, to accelerate bioenergy deployment and to scale up energy transition.

Toshimasa Masuyama, IRENA, described the role of bioenergy in the Global Energy Transformation. He discussed the Roadmap to 2050, in light of the climate targets of the Paris Agreement, and underlined that the current policies are not sufficient to meet the well-below 2°C climate target (REmap Case), instead they will most probably result in a +2.6°C scenario (Reference case). There is an urgent need to align global energy policy in order to reach the REmap Case in 2050. Renewable energy, electrification and energy efficiency play a key role in the REmap case 2050: they can provide over 90 percent of the necessary reductions in energy-related CO_2-eq emissions. In 2050 Reference case Total Primary Energy Supply (TPES) is expected to increase by 24 percent, compared to the current level. Nevertheless, by accelerating the deployment of renewables, electrification and energy efficiency, in the REmap case, TPES will be reduced slightly below the level of today. In the case of the REmap case, modern bioenergy consumption must grow in all end-use sectors: buildings, transport and industrial. At the same time bioenergy will contribute by 7 percent to total electricity generation. Modern bioenergy should be deployed more than four times than the current level. IRENA envisages 125 EJ of Primary modern bioenergy demand in 2050, of which: 6 percent for bioenergy in buildings, 23 percent for bioenergy to provide industrial process heat, 34 percent for biomass power, 27 percent in the form of liquid biofuels or biogas, mainly for transport and 10 percent for other uses. Expansion of energy consumption will be particularly significant in Southeast Asia, especially in relation to the industrial sector with modern bioenergy use increasing 5 times compared to the current level.

Maria Michela Morese, Executive Secretary of GBEP, gave an overview of the role of GBEP, which was established to implement the commitments taken by the G8 in the 2005 Gleneagles Plan of Action, to support "biomass and biofuels deployment, particularly in developing countries where

biomass use is prevalent". Since then its mandate has been renewed many times both by G8/G7 and G20. Globally, GBEP brings together 38 Partners and 41 Observers from public and private sector, as well as involving civil society. GBEP has two principle priorities: to facilitate the sustainable development of bioenergy and to facilitate the development of capacities for sustainable bioenergy. Dr. Morese gave details of the set of 24 GBEP Sustainability Indicators for Bioenergy developed in 2011, and their implementation in 14 countries. She stressed the interlinkages between bioenergy and the 2030 Agenda, along with commitments towards the Paris Agreement. GBEP is currently developing an Implementation Guide to provide more guidance on measuring the sustainability indicators and facilitate their implementation in further countries. A first draft of the Implementation Guide will be soon available on the GBEP website as a 'living document', to be updated as more guidance is produced from further experience on indicator measurement. Monitoring the sustainability of the national bioenergy sector is a necessary step in order to understand, evaluate and improve the performances of the sector. GBEP is actively working on the diffusion of sustainability in the processes of production and use of bioenergy resources with several activities and tools, including the GBEP Sustainability Indicators for Bioenergy (GSIs) and its Implementation Guide. Dr Morese noted that GBEP represents an important forum for policymakers to discuss and harmonise policies.

Session 2: Exchange of experiences and opportunities on liquid biofuels.

H.E. Musdhalifah Machmud, Deputy Minister for Food and Agriculture, Coordinating Ministry of Economic Affairs, Indonesia, presented on the experience of Indonesia on bioenergy, with a focus on biodiesel palm oil (PO) pathway. She introduced the country's Energy Mix Strategy, which set a 23 percent target for RE by 2025, and spoke about the "Emissions reduction target for 2030" set for Indonesia under the Paris agreement (29 percent unconditional and 41 percent in case of provided international support). The PO sector will contribute to achieve the settled targets through various actions: 1- the smallholders replanting programme, to increase PO productivity; 2- the Forest fire prevention management; 3- the implementation of the Biodiesel Mandatory Programme (BMP); 4- the use of Palm Oil Mills Effluents (POME) to increase electricity supply in rural areas. Indonesia started its BMP in 2006, by setting a first biodiesel blending mandate at 2.5 percent. Then the mandate has been continuously increased up to B20 in 2018. The country is expected to implement a B30 mandate by 2020. The BMP is a sound policy: its impacts have been positively evaluated for the period Aug.2015 – Dec. 2018. BMP has brought to: an increase in the use of RE, reduced CO_2-eq emissions, creation of new jobs in biodiesel industry; increase of smallholders farmers' income; savings from imports of fossil fuels (≈ USD 3.73 billion). BMP can benefit of the strong commitment from the local government, which aims to widen the use of biodiesel in all sectors: transports, industry and commercial business, SME, fishery, agriculture, power generations and others. H.E. presented the challenges currently affecting the implementation of the BMP for 2020: 1- quality of biodiesel, specifically on blending process; 2- logistic and infrastructure facilities; 3- consumers: they have concerns about the use of B30 in their vehicles; 4- stakeholders support. Current capacity for biodiesel production is sufficient to cover the domestic demand and allows for exports.

Mateo Lorenzo, Ethanol Producers Association of the Philippines (EPAP)**,** gave an overview on the ethanol sector in the country by highlighting the main barriers for the development of the sector and the ways to overcome them. The Biofuel Act of 2006, defined blending mandates for bioethanol (10 percent) and biodiesel (2 percent). The purposes of the law was to promote the development of the RE sector in a view to reduce GHG emissions, to increase rural employment and to ensure the availability of alternative and renewable clean energy without any detriment to the natural ecosystem, biodiversity and food reserves of the country. Nevertheless, until 2012, investments to boost ethanol production and

use in the country were limited. In 2018, there were 12 accredited ethanol plants in the country, with a total actual production of 296 Mlitres, sufficient to cover only the 45 percent of E10 demand. The remaining demand was covered by imports, which are actually preferred due to cheaper import price. Three main barriers affect the bioethanol sector in the country: 1- feedstock shortage: sugarcane and molasses are currently used as main feedstock, nevertheless sugarcane harvested area is declining and local molasses production (1.1 Mtonnes) is not sufficient to cover the demand for ethanol producers (1.5 Mtonnes). The national law doesn't allow for feedstock imports. Possible solution to overcome this barrier is to diversify the type of feedstock used e.g. by allowing the use of corn, sweet sorghum, cassava, nipa or sweet potato. As an alternative, import of molasses should be temporarily allowed. 2- Difficulty to lease big sugarcane plantations. Large plots of land are much easier to manage than small plots scattered around which imply the need to transport continuously labour and farming equipment, workers and products. A program with DENR should be created to lease land for production of feedstock to produce bioethanol. They will make it feasible to invest in developing the properties for feedstock production, through irrigation and by optimizing the land preparation. 3- Lack of labour: it is getting harder and harder to find workers, especially for harvesting. A possible solution to overcome this barrier is to increase mechanization.

Rafael Diaz, Petroleum & Biofuels Consultant - Asian Institute of Petroleum Studies, Inc. presented on the main concerns affecting diesel use and on how Coconut Methyl Ester (CME) biodiesel can contribute to overcome them. Diesel contains high molecular weight carbon, which causes incomplete combustion and emissions of pollutants. Furthermore, oftentimes the engine fuelled with diesel are old, and prone to carbon deposition. The addition of CME biodiesel, which contains medium C chain saturated, facilitates the reduction of the boiling point thus reducing the risk of incomplete combustion and consequent emissions of pollutants. Mr Diaz showed the result of a research that compared the combustion of a) diesel as such, b) 2 percent CME biodiesel; and c) 5 percent CME biodiesel, in terms of PM deposition and PM emissions. The study demonstrated that both PM emissions and PM deposition are reduced by increasing the share of CME oil added to diesel. Mr Diaz highlighted also the advantage of using CME biodiesel compared to other type of biodiesel. In fact, it is widely known that biodiesel reduces the emissions of primary pollutants (e.g. HCO_2 and SOC), but causes the increase of NOx emissions. On the contrary, CME biodiesel can neutralize NOx emissions. Mr. Diaz concluded that, according to the Philippine experience, CME biodiesel allow to maximize engine efficiency and optimize fuel efficiency, with positive externalities for air quality and public health. Furthermore, its production and use brings social and economic benefits to local population.

Thibodee Harnprasert, President Society of Automotive Engineers of Thailand (TSAE), presented some statistics on the number of total vehicles registered in Thailand on Dec. 2018, and on the number of new cars and motorcycles sold in the last three years in the country. Official data demonstrate that the number of E20 cars sold has constantly increased from 2016 onwards. On the other hand, the sales of E85 cars has only slightly increased from 2016 to 2018, and remained constant in the first months of 2019. Mr. Harnprasert gave also an overview of ethanol history, production and consumption in Thailand. Ethanol production started almost 15 years ago and it has constantly increased from 2012 ahead, up to 1,466.74 Mliter in 2018. Currently, 26 ethanol plants have been installed in the country, with a total capacity of 6.2 Mliters per day, and an actual production of approximately 5.9 Mliters per day. 11 plants use cassava as feedstock, 6 plants are fed with molasses, and the rest of them use both of the above mentioned feedstock. Total gasoline consumption increased constantly in the last four years, but pure gasoline consumption gradually decreased from 2016 ahead, probably replaced by E10 (Octane 95), E20 and E85 whose consumption has regularly increased in the same period. Average

biodiesel (B7 and B10) consumption has remained almost constant in the last three years, and recently B20 has been introduced into the market. Mr. Harnprasert concluded that Thailand is ready for widening the use of biofuels, especially ethanol, thus achieving substantial social, environmental and economic benefits.

Flavio Castellari, APLA, Brazil, presented on Brazil's experience in ethanol, describing the trends and technologies. Ethanol currently constitutes nearly 65 percent of Brazil's sugarcane market (33 billion litres in 2018/19) and replaces around 40 percent of gasoline. Mr. Castellari outlined the benefits of sugarcane ethanol fuel in terms of the rural development opportunities, the reduced GHG emissions, better performance and lower petroleum usage. He noted that flex fuel technology, currently highly used in Brazil, was not invented in the country but has expanded because there have been public policies that incentivize flex fuel vehicles. He also mentioned innovative designs such as the Prius Flex car, produced by Toyota, which is the first Hybrid Flex car in the world that can run by different fuels: ethanol and gasoline, with electrical propulsion. Mr. Castellari concluded by highlighting the importance of sugarcane in Brazilian bio-economy. Besides car and aviation biofuels, sugarcane can produce food (sugar), drinks, electricity (bagasse for steam and electricity production through cogeneration technologies), bioplastic (500 Mt produced last year). He also underlined the flexibility of ethanol, which can be used as fuel for cooking stoves, electricity generator, aviation and sugarcane biodiesel. Mr. Castellari concluded that energy diversification is needed as 100 countries in the world could supply biofuels to 200 nations whereas there are currently only 20 countries that can offer petrol to the world.

Miguel Almada, Director of Bioenergy, State Secretariat of Agroindustry, Argentina, gave an overview of the energy matrix of Argentina. They are currently dependent on fossil fuels; only 9.4 percent of energy supply comes from renewable sources and biofuels only makes up 3.7 percent of the energy matrix. In 2006 the government released laws to promote the production and use of renewable energy, and established mandates for both ethanol (12 percent) and biodiesel (10 percent) use. Mr Almada explained the comparative advantages of Argentina in the production of feedstock for biofuels: it has large and fertile extension of land for crops production. Argentina is the 3rd most important world producer of soybean, that is the main raw material for biodiesel production. From 1990 up to date, total soybean production increased by 5 times, whilst its harvested area increased just by 3 times. Soybean yield doubled and new, more efficient technologies were implemented. Currently there are 37 biodiesel plants in the country, with a total annual production capacity of 4.5 Mtonnes. In 2018, 2.3 Mtonnes were actually produced, the 55 percent of which was exported and the rest went to internal market. Argentina has been for many years a large exporters of biodiesel in the world. The implementation of the GBEP sustainability indicators in Argentina has demonstrated that Argentina biodiesel production model reduces GHG emissions by 70 percent compared to fossil fuels. In 2018 total bioethanol production in Argentina was 1.1 thousand m^3, with 50 percent of it coming from sugarcane and the rest from grains. Mr Almada concluded that Argentina is a large agricultural producer of raw materials and manufactures, thus the national production and use of biofuels is expected to increase. The development of bioenergy in Argentina is a way to diversify and to add value to agricultural produce, while providing positive externalities such as social and economic development, besides the positive impacts on the environment.

Shabbir Gheewala, King Mongkut's University of Technology Thonburi - Bangkok, explained that in Thailand, bioenergy is expected to contribute at least by 20 percent to the CO_2-eq mitigation target set in non-conditional NDCs Roadmap for 2030. The country is ranked as ASEAN's 2nd and the world's 8th largest biofuel producer, with transport biofuels coming mainly from 1st generation plants. Currently, there is no advanced biofuel production in Thailand. The national "Alternative Energy

Development Plan 2015-2036" set production targets for 2036, respectively at 11.3 Mliters/day and 14 Mliters/day for bioethanol and biodiesel. As of today, biodiesel is produced from palm oil and ethanol from molasses and cassava. Current commercial available blends are B7 and B20; E10, E20 and E85. In a view to further promote the national biofuels sector, new policies have been recently issued to allow for the expansion of sugarcane (+60 percent) and oil palm harvested area (+78 percent) in the period from 2014 to 2036. In the same period, further investments will be done to increase biofuels crops yield via plant genetics and development of cultivation practices. The biofuel sector is expected to expand, thus new ethanol and biodiesel plants will be established in the forthcoming years. Biodiesel has a big impact on local economy. Currently, 55 percent of oil palm is for food and the rest is used for biodiesel production. OP production occurs mainly at smallholders scale (differently from what happens in other asian countries, e.g. in Malaysia) and there is still large space to improve it.

Paul C. W. Roberts, Alcotra Singapore Pte Ltd, closed the 2nd session by giving a global overview on ethanol trade with a focus on the Asia and Pacific region's Biofuels Market progression. US and Brazil are, at present, the most important fuel ethanol traders, with the vast majority of all ethanol fuel traded globally coming from US, whilst Brazilian ethanol exports go mainly to California. Mr Roberts spoke about the various blending mandates currently in place in various countries within the Asia and Pacific region. An E10 mandate is currently in place both in India and in the Philippines, although both of these countries do not have enough feedstock to cover the domestic demand of ethanol. As a consequence, substantive imports are required. China is supposed to implement an E10 mandate by 2020, but this would require 40 M tonnes of ethanol, whilst the total current world traded ethanol is about 6 M tonnes. Blending options currently used in Thailand are E10, E20 and E85. In Australia biofuel mandates do not cover the entire country and are modest (E3 or E6) compared to other countries in the region. Mr Roberts gave also an overview on ethanol market in Brazil, in Europe (where domestic production is limited) and in the US, which is currently facing important challenges due to an increase in corn price and to new restrictions for ethanol imports currently in place in EU, Brazil and others countries. Europe is currently a net importer of ethanol fuel, which comes mainly from Central America. Mr. Roberts concluded by summarizing the future for ethanol in Asia. He highlighted that the lack of feedstock will prevent to fulfill the mandates settled in China, Philippines and India. Indonesia and Malaysia will focus more on biodiesel as a platform for renewables. Whilst Australia has the ability to produce, but weak state governments do not seem to act decisively.

Day 2 – Wednesday 26 June 2019

Session 3: Exchange of experiences and opportunities on biogas, biomethane and waste to energy.

Rose Margot Omega, FDR Integrated Resource Recovery Management Inc. (FDR-ITTMI), spoke about the experience of the company which has installed a Dry Anaerobic Digestion (DAD) biogas plant in Cebu, Philippines, to produce electricity from municipal organic waste. Besides DAD, the company currently provides also other related services such as waste collection, treatment and disposal. The DAD biogas plant in Cebu produces electricity and compost while recovering heat. Gas and leachate production are continuously monitored. Products and by-products are stored and checked for quality. DAD's experience has brought to important lessons learned: 1- the initial quality of raw material is key for the quality of products and by-products, hence it is extremely important to enhance the quality of raw material through a high level of waste segregation-at-source and significant

investments in efficient pre-treatment systems. 2- Costs savings from recovered energy are not enough to cover sustained costs, so there is the need for adjustments in tipping fees. 3- Ensuring preventive plant maintenance and establishing programs to enhance and motivate the key personnel is key to keep operations efficient. Ms Omega concluded by explaining the future steps needed to further develop and scale up the Anaerobic Digestion value chain in the Philippines: in relation to the DAD, the capacity for MRF and RDF should be increased and the model should be replicated in other cluster LGUs with enough waste tonnage, long-term agreement & financial commitment. In addition, new more complex biogas system for AD of organic slurry (ADOS, 'wet-type') should be installed. Last but not least, more investments should come to allow for the upgrade of biogas to bio-methane.

Pham Quang Ha, Vietnam Academy of Agricultural Sciences (VAAS), gave an overview of the biogas sector in the country and described, through a SWOT analysis approach, the key features of the sector, which represents one of the most important bioenergy pathway in the country. In Vietnam biogas production occurs at household scale, at farm and at industrial scale. While in the first case it is used for cooking, heating and lighting, its use at farm scale is very limited and it is adopted just as a waste management facility. Power production occurs only at industrial scale, where biogas plants is used to reduce the use of coal. The main feedstock for biogas in Viet Nam is pig manure, which is largely available in the country, thus ensuring a large potential for the future development of the biogas sector. For the future it is extremely important to promote power generation from biogas at farm and industrial level, while exploring opportunities to further distribute biogas to local communities. Among the main barriers to biogas adoption, Dr. Pham Quang Ha mentioned the lack of technical skills to install and maintain anaerobic digesters, the limited use of digestate, the poorly developed biogas-based energy conversion equipment, with low heat conversion efficiency and the lack of institutional coordination among relevant national/local entities, private sector and international donors.

Klaus Schmitt, GIZ representative in the Philippines, gave an overview of the activities performed in Panay Island, under the Project ForClim (Forest and Climate Protection Panay II Project), funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) through its International Climate Initiative (IKI), and jointly implemented by GIZ and the Department of the Environment and Natural Resources of the Philippines (DENR). The project aimed to support the use of biomass to replace fossil fuel and reduce GHG emissions in off-grid area, through the installation of flatbed rice dryers which use biomass (rice husk) as energy source. Rice production in Panay Island is, on average, 1.6 Mtonnes/year and it causes a total of 42,500 tonnes of CO_2-eq emissions. It has been estimated that 35 percent of the rice hulls annually produced in Panay could be used to dry the entire island's rice production. Dr Schmitt concluded that using biomass flatbed rice dryers can result in significant GHG emission reduction (-32,716 tonnes CO_2-eq per year) and significant cost savings (over 636 million PHP/year or about 10 M Euro) compared to conventional flatbed dryers, if the entire harvest in Panay would be dried by using biomass.

Masayasu Asai, Policy Research Institute, Ministry of Agriculture, Forestry and Fisheries (PRIMAFF), Japan, gave an historical overview of the biogas sector in Japan, which history started almost 20 years ago, triggered by the Kyoto protocol and further promoted by the release, in 1999, of the national "Manure Management Act", which set the basis for appropriate manure treatment to reduce GHG emissions. A second boom occurred soon after the disaster of Fukushima nuclear energy plant in 2011, which induced the local government to release, on 2012, policies and incentives to promote the production of renewable energy, such as Feed-in-tariff (FIT) for biogas generated electricity and construction subsidies. Dr. Asai presented the results of a consultation among various national stakeholders (e.g. farmers, university representatives), to define expected results from the biogas systems, and barriers to and drivers for an expansion of the biogas system. All various stakeholders highlighted the key role of biogas as energy production system and as an additional source of income. Nevertheless, stakeholders outlined also the environmental risks that could derive from an improper digestate management and expressed their hesitation to accept digestate as an appropriate fertilizer due to several technical and non-technical constraints. A further point for discussion is the resilience of

biogas systems which used FIT. As of today these type of plants are not self-sufficient, thus they stop their power production in case of blackout, as it occurred on Sep 6, 2018 following a huge earthquake in Hokkaido. In the forthcoming future it would be key to promote the installation of biogas off-grid systems that can ensure power production also in case of emergency due to natural disasters.

Ahmed Abdelati, Egypt, presented the result of a SWOT analysis recently carried out on the biogas sector in Egypt. Among the strengths, he underlined the fact that anaerobic digester have limited running costs, while also providing energy used to replace LPG, and digestate used by local farmers as organic fertilizer. Among the weaknesses of this bioenergy production system, he highlighted that biogas production decreases during the winter period, due to low temperatures in the country (below 18°C). Furthermore, the system represents a win-win solution only when it is established in rural areas or in tourist resorts that have large land availability to displace digestate. Biogas represents an important opportunity to waste management and could replace 50 to 100 percent of LPG used in the country at household level. The Egyptian government's aims to stop subsidizing fuel products by the end of 2019, and this could facilitate the adoption of bioenergy systems in the country. Prof. Abdelati also presented the main outcomes and lessons learned from the implementation of the GBEP Sustainability Indicators for Bioenergy (GSIs) in Egypt. Up to date, the GSIs have been measured twice to assess bioenergy sustainability in Egypt: the first measurement focused only on thermal gas in one agro-ecological zone, while the second analyses focused on biogas production at household level in three regions of the country. The measurement assessed: lifecycle GHG emissions; soil quality; change in income; jobs in the bioenergy sector; and change in consumption of fossil fuels and traditional use of bioenergy. The economic feasibility of household biodigesters was also assessed, and the biogas plant of $6m^3$ resulted as the most viable size from profitability, productivity and ability to tolerate risks that may arise in the production process; it was also the most prevalent size (70 percent of all plants in the country).

Suani Coelho, University of Sao Paulo, Brasil, describes the huge potential for biogas and biomethane in the state of Sao Paolo (Brazil). This area presents a large availability of various type of feedstock that can be used to feed biogas facilities (e.g. sugarcane vinasse, sewage sludge, rural and animal residues, agro-industrial waste and landfills). She highlighted that the Research Center for Gas Innovation has recently developed and published on-line a georeferenced map that shows the biogas potential in each region of the Sao Paolo state (here available). The map is addressed to various types of stakeholders, such as policy makers, investors and academic. She reported on the results of a research study that evaluated what is the best use of vinasse biogas: vinasse concentration; electricity generation; diesel oil replacement; and grid injection. The study evaluated the use of biomethane to replace diesel oil in sugarcane mills fleet as the most effective option since it allows for several positive externalities: it allows to avoid diesel costs (-1 billion USD/harvesting season); to reduce GHG emissions; and to improve the energy and C balance for the sugarcane-base ethanol pathway that finally results more sustainable.

Alexander Gardemann, ABIOGAS, Brazil, emphasized the flexibility of biogas production in Brazil. It could be produced from different type of feedstock (sugarcane, agribusiness and sanitation waste and residues), and produce different type of outputs, such as biogas for electricity generation and biomethane, that is equivalent to natural gas. Biomethane could be used to replace diesel for transportation as well as injected in the natural gas pipeline. It could be considered as an advanced biofuel. It is C neutral or even C negative (on dependence of production conditions), since it allows to avoid methane emissions from waste and residues decay. In Renova Bio, the new national biofuels law of Brazil, biogas and biomethane are eligible to receive incentives, since their role in contributing to achieve the planned annual C reduction targets is largely recognized and certified through LCA analysis. Currently in Brazil there are 125 biogas plants, almost all of them are concentrated around existing pipelines. Mr. Gardemann has also illustrated a series of success stories of biogas plants in Brazil.

Session 4: Exchange of experiences and opportunities on advanced biofuels

Bas Melssen, introduced Novozymes, a Danish Company that produces specific types of enzymes to be applied to 1st and 2nd generation ethanol, to biogas and to biodiesel production processes. These enzymes can optimize the conversion of feedstock into biofuels and can enable higher yields, faster throughput and lower processing costs. The company is currently the global leader in industrial enzymes (it covers the 48 percent of global market share). Then Mr. Bas gave an overview on the future of bioenergy. He explained that, in order to meet the 2 degree climate target, a portfolio of solutions and technologies across all sectors is needed. Power production by solar and wind can fuel cars and trains, but not Heavy Duty Vehicles (HDVs), such as trucks, tractors, planes, trains and ships that, in 2050, will drive the global demand for transport fuel. Furthermore, it is important to find ways to stabilize our electrical grids, to even out the natural spikes in electrical supply created by solar and wind. Bio refinery offers a sustainable way to fuel HDVs and to generate power through Combined Heat and Power systems, in order to create more stable grids. Last but not least, bio refinery contributes to pull C out of the atmosphere, thus accelerating the achievement of climate target. The technology is both commercially viable and available now.

Toshimasa Masuyama, IRENA, gave an overview on the adoption of biofuels obligation for transport in all countries at global level. South East Asia countries have increased their existing obligation in 2016. At global level, just a few countries introduced obligations for Advanced Biofuels. IRENA foresees a significant increase in the liquid biofuels consumption up to 2050 and attributes an important role for both electric vehicles and biofuels for decarbonizing the transport sector. Nevertheless, in the last decade, global biofuels investment are on a declining trend. Recently IRENA has conducted a survey by involving stakeholders from the private sector, to identify the main barriers which prevent investment in advanced biofuels. According to this study, the most important group of barriers to investment in advanced biofuels relates to lack of stable regulation, including mandates and subsidies. This barrier is followed by the cost competitiveness of advanced biofuels production, including "conversion efficiency & CAPEX" and "feedstock price". Feedstock availability in the long term is not perceived as an important barrier to advanced biofuel business expansion.

Elena Chum, National Renewable Energy Lab (NREL), US Department of Energy (DOE), gave an overview on the US bioenergy programs, with a focus on transport fuels. In 2017 US fuel consumption was more than 200 Gallons, with ethanol contributing significantly to cover the domestic demand for fuels. Ethanol fuel production has grown significantly in US since 2001, spurred by legislation and regulations. In 2018 US was the largest world ethanol producer (56 percent of world ethanol production) and the lead world exporter (61 percent of world ethanol trade). At the base of this success is the collaboration among all relevant authorities of the federal government, departments and agencies (e.g. DOE, DOD, USDA, EPA). Ms Chum explained the contribution of the Bioenergy Technology Office (BETO) in the development of the bioeconomy and biofuels sector in the US. BETO is focused on forming public-private partnerships with key stakeholders to research and develop technologies to produce advanced bioenergy and bioproducts from non-food, feed, or fiber biomass. Its mission includes reducing technology and systems uncertainties and enabling their affordability through R&D that includes sustainability analysis throughout. BETO has supported since 2006, a total of 42 pilot, demonstration and pioneer-scale facilities. Ms Chum concluded by gaving an overview on the Bioeconomy Initiative and of its **Implementation framework**, recently released by the federal Biomass Research and Development (BR&D) Board. The Framework is the third report in a series of documents to initiate and coordinate federal agencies efforts to support the expansion of a robust domestic bioeconomy sector in the US.

Paolo Corvo, Clariant - discussed on the contribution that transportation biofuels, and in particular 2G biofuels, can give to meet the 2°C climate target. The European Union legislation mandates for a 3.5 percent target of advanced biofuel in transport fuel by 2030. Also China has set an E10 target by 2020 with strong support from the government on non-food based biofuel & 2G ethanol demonstration and commercial plant. The Ministry of Petroleum & Natural Gas of India has planned twelve 2G ethanol plants to be built by Indian Oil companies by 2022. Mr Corvo presented the sunliquid® technology, an innovative approach developed by Clariant, which consist of an integrated solution that allows for 2G sugars & ethanol production. The sunliquid® is a fully integrated process, characterized by a completely chemical free pre-treatment; process integrated enzymes production; and simultaneous C5/C6 fermentation. A further advantage of the sunliquid® technology is that it allows for the use of various feedstock with specific enzymes, thus overcoming the challenge due to feedstock shortage and to fluctuations of volume and price of feedstock. The performance of the technology is guarantee by more than 6 years testing experience in a pre-commercial plant established in Germany.

Session 5: challenges and opportunities for the development of bioenergy.

Olivier Dubois, FAO, opened the session by discussing on the need to debunk some myths and to focus on realities and needs, if we want to overcome the challenges preventing the widen production and use of biofuels. The 1st myth is that food-based feedstock are always bad for food. This is not always true: Brazilian sugarcane based ethanol production is an example of an efficient and integrated food and fuel system model. The use of flex crops can guarantee for the production of both food and fuel, thus adding value to food crops. As of today, it is commonly agreed that there is enough land for food and fuel production, but challenges derive from whose and what type of land (e.g. marginal land) to be used for food or fuel production. The use of food crops for feedstock is just one of the several factors affecting food price. The 2nd myth is that 2nd generation (2G) biofuels are always more sustainable than 1G biofuels. This myth derives from another myth, that assume always higher ILUC risk in case of 1G biofuels compared to 2G biofuels. Indeed, ILUC risk can affects also 2G biofuels, for instance in case of large scale mono-cropping plantations. Another myth is the fact that the use of residues and by-products as feedstock could represent the panacea for feedstock shortage related issues. Indeed, the use of by-products and residues allows for 10-30 percent reduction in land needs. Nevertheless, their use is not always sustainable due to the existence of competitive uses and/or because of existing difficulties in handling them. Mr Dubois concluded by highlighting the following points: 1- evaluating the sustainability of different bioenergy systems is complex and simplification should be avoided; 2- there is currently enough knowledge and tools to move from "food versus fuel" to "food and fuel" and from "model-based ILUC policies and actions" to "low ILUC risk practices and policy support"; 3- what matters is feedstock sustainability, hence the way crops are managed for food and non-food purposes, rather than their type; 4- the key issue is not about choosing between 1G or 2G biofuels: these two pathways should continue to be developed in parallel because we can't drop 1G if we want to reach the climate change targets.

Rangsit Hiangrat, Director General of the Sugar Millers Association in Thailand, gave an overview on the current status of the sugar industry in his country. Sugarcane cultivation currently covers the 8 percent (≈1.6 Mha) of total agricultural land in the country and involves ≈ 300,000 families. At present, there are 56 sugar mills, mainly located in the northeast and central parts of the country. Sugar domestic consumptions accounts for approximately 20 percent of total sugar production, whilst the rest is exported. Besides sugar, the sugar industry produces annually 5 Mtonnes of molasses and 32 Mtonnes of bagasse, which constitute an abundant potential source of feedstock for bioenergy production. The sugar industry has constantly grown up since the '80, and currently represents an

important contributor to Thailand bio-economy sector. Thailand has recently set 10-years goals for bio-economy to foster the production of high value products such as food and feed additives, cosmetics, biochemical, yeast, bio-plastic and others, besides agricultural and bioenergy products. In 2015 the country has set a 30 percent RE target by 2036, to be achieved through the implementation of the 'Alternative energy development plan'. This plan foresees the contribution of bioenergy in the production of power, heat and fuel. All sugar mills set in the country produce electricity via cogeneration for internal use. Most of them sell excess power to the grid. Bioethanol and biodiesel equally contribute to the country's TPES. Ethanol is produced mainly from molasses and cassava and is primarily addressed to the domestic market. For the future development of the country sugar industry, it would be extremely important to realize integrated plants to produce sugar, ethanol and power (both from cogeneration and biogas systems).

Don Mario Y. Dia, President of the Biomass Renewable Energy Alliance (BREA) in the Philippines, introduced the biomass power production sector in the Philippines and explained its main strengths as well as the main barriers preventing its further development in the country. Philippines can count on abundant supply of biomass among crop and forest residues, agro-industrial and municipal solid waste. The current production capacity for biomass to power in the country is around 356.1 MW. It is concentrated in the Island groups of Luzon (156.81 MW), Visayas (162.5 MW) and Mindanao (36.79 MW). The main feedstock used for power generation are agricultural residues with not intrinsic value, such as rice husk, bagasse, and cane trash. A minor amount of power is generated through biogas facilities (24.56 MW). Currently only the 8 percent of biomass produced in the country is used for power production, but in the future, the increase of demand for energy supply and the increase of fossil fuels costs, will stimulate investments for the development of more biomass facilities. The main barriers for the development of biomass to power industry are: 1- the feedstock, in particular quantity and quality concerns and the management of resource supply; 2- the Project lead-time: it takes longer than to install wind and solar facilities; 3- the cost competitiveness, compared to traditional and other RE source; 4- the regulatory compliance: strenuous and fragmented permitting process. To overcome these barriers it is extremely important to simplify (through the involvement and coordination with local, regional and national authorities), educate (to increase awareness and interest on biomass energy) and invest (in R&D to modernize agri- and waste sector, to monitor and evaluate the impacts of biomass to power at local, national and international level). Biomass to energy can bring multiple environmental, economic and social benefits to the country, such as replace coal and allow for substantial CO_2-eq savings; be an effective waste management strategy; create jobs and additional income for farmers, among others.

Gerard Ostheimer, WBCSD, presented the contribution of Below50 and how we can create new paths to a renewable carbon economy. He provided a brief history of the biofuels ecosystem from 2008 to the present day: from 2008 to 2015, biofuels demand was entirely policy driven, which was gradually eroded over that time by NGOs concerned about the fuel vs. food debate, and fossil companies pressures. In 2015 the international community agreed to new Sustainable Development Goals and to work to combat climate change, leading to renewed interest, which requires political will and the engagement of the private sector to turn this interest into meaningful on-the-ground deployment. Dr. Ostheimer noted that there are numerous international technical agencies that are promoting increased bioenergy production and use by information sharing, but policy advocacy, as well as greater links with private sector are required to stimulate global demand. Below50 works to grow the global market for low carbon fuels that have less than half of the emissions of fossil fuels. EU policy and Private Sector demand are combining to drive investment in Europe: he mentioned the case of a massive

project in Netherlands with KLM, and the "Sustainable Shipping Initiative" which promote the use of biofuels as maritime fuel.

Timothy Tierney, Director of Strategic Marketing in North Asia, USGC spoke about the worldwide ethanol trade, which doubled in the last two decades, up to 2.6 M Gallons in 2018, with US as major contributors (1.62 M Gallon). US exports are expected to remain stable in 2019 as lower exports to Brazil and China (which are two out of seven priority markets for US) will offset the broad-based growth to other markets (e.g. Africa, Malaysia, Chile). Mr Tierney gave an overview on biofuels policies around the world: currently 60 countries have biofuels policies in place and, since 2017, 10 countries have announced new policies or significant expansions to the existing ones. Nevertheless, many countries can't cover their ethanol domestic demand with their internal production, as in the case of the Philippines. Moreover, bioethanol production is subject to feedstock production which, on its side, is subject to weather variability. Feedstock production shortfalls can prevent the achievement of blend goals. If imports are allowed, blend goals can be met every year. Therefore, it is important to allow for imports, in order to demonstrate commitment to policy and blend goals to investors. Stable policies are key to promote investment, and it is also important to lower CAPEX investment risk: bio-refineries are expensive. Low petroleum and fossil fuel tariffs slow the adoption of biofuels. Import restrictions and high ethanol tariffs (20 percent or more) inflate fuel prices to consumers and discourages use. Mr Tierney concluded by mentioning the USGC multilateral collaborations currently in place and the ones forecast for the next future.

Stephen Peters, Senior Energy Specialist for the Asian Development Bank (ADB), presented on the ADB historical experience on waste to energy (W2E), with a focus on W2E projects carried out in various countries during the last years with the financial support of ADB. These project were characterized by common objectives, such as: to put in place innovative waste management solutions to reduce waste volume and the amount of GHG emissions derived from them; to enhance employment opportunities for local people; to generate power and heat to increase access to modern energy sources. W2E projects financed so far included: landfills and capture of landfills gas (PRC); biogas production from cassava wastewater (Thailand); waste incineration to power (PRC and Viet Nam). Amongst the activities financed by ADB, Mr Peters focused on the development/enhancement of new digital tools, to optimize waste collection, trading, tracking and treatment. ADB is supporting the development of APPs which can be used to link willing donors to promote clean-up efforts, with actual proven clean-up activities. Digitalization is key to support the development of circular economy, promote gender inclusion and reduce climate change. Mr Peters concluded by highlighting the challenges affecting future financing of bioenergy technologies and the solutions to mitigate them.

Conclusions and closing remarks

Maria Michela Morese, Executive Secretary, GBEP, concluded the event expressing her appreciation for the varieties of experiences shared in the two days event, both from the region and beyond. Though the assembling of relevant stakeholders, the Bioenergy Week has helped to foster collaboration opportunities for the future. As take home messages of the event, she underlined the key importance of sustainability; the importance of communication, raising awareness and public support, which is likely to influence policy making and stability; the need for clear and stable policies that represent a stimulus for investments and therefore market development. This Bioenergy Week has contributed to share knowledge and best practices that could and should be replicated in other countries. She also emphasized that this event was a new opportunity to confirm that a "one size fits all" solution is not correct and that the local context should be always analysed and deeply considered to understand

what type of bioenergy system is sustainable. Increase awareness raising to all relevant stakeholders is essential to foster sustainable bioenergy development, thus contributing to achieve the socio-economic development, to secure environmental quality, and to meet the SDGs as well as NDCs. This Bioenergy Week has been an opportunity to learn about bioenergy challenges and opportunities in the region, with a view to take out the best from the opportunities and to address at the utmost the challenges.

Bilateral meetings – 25 – 26 June 2019

The 7th Bioenergy Week represented an important opportunity to organize bilateral meetings amongst relevant stakeholders to discuss key concerns currently affecting the bioenergy sector and, in particular, biofuels production and use in the Asia and Pacific region. Below, in a nutshell, the contents of three bilateral meetings held during the Bioenergy Week:

- the Brazil delegation with Philippine government representatives, sugarcane planters, bioethanol producers, sugar millers, and research institutes discussed future collaboration on sugarcane varietal exchange and new technologies;
- USGC-EPAP with Department of Agriculture Corn Program Executives of the Philippine government explored the possibilities of using corn as bioethanol feedstock in the Philippines; and
- USGC - EPAP with Southeast Asian Countries, amongst which Philippine, Thailand, and Vietnam delegates from both the government and private sector, discussed future collaboration on bioenergy development.

Field visits – Thursday 27 June 2019

Three field visits were organized and took place on the third day of the 7th GBEP Bioenergy Week. Participants had the opportunity to choose among the three following options:

- **Bioethanol production plant in Brgy. Talisay, Calaca, Batangas**. The plant is property of a local company, the Balayan Distillery Inc. It represents one of the 10 fuel ethanol plants operating in the country as of 2017, according to last official data published by the government. It has a potential production capacity of 30 Million Liters and is fed with molasses, locally produced.

- **The Chemrez Biodiesel Plant, in Quezon City.** The plant was completed and inaugurated on May 2006. The plant, which uses coconuts as feedstock, has a diversified production which includes food oil, paint, cosmetics and home care products, as well as coco-biodiesel. The coco-based biodiesel produced goes under several quality checks before being delivered to various oil companies in the countries. These quality checks are performed by internal labs, that verify that the oil meet the standard requirements established by each oil company. Different oil companies have different standard requirements. The present capacity of the plant is 30 k Million liters per day.

- **Biomass power plant in San Jose City, Nueva Ecija**. The plant has a production capacity of 12 MW. The plant generates electricity using rice husk as feedstock. It was the first biomass power project to be launched after the feed in-tariff rates were approved on July 27, 2012.