USDA United States Department of Agriculture
Foreign Agricultural Service

GAIN Global Agricultural Information Network

Voluntary Report – Voluntary - Public Distribution **Date:** October 18, 2022

Report Number: RP2022-0054

Report Name: Biofuels in the Philippines Renewable Energy Program for the Agriculture and Fisheries Sector

Country: Philippines

Post: Manila

Report Category: Biofuels, Agriculture in the News, Climate Change/Global Warming/Food Security

Prepared By: Florence Mojica-Sevilla

Approved By: Mark Hanzel

Report Highlights:

The Department of Agriculture (DA) and the Department of Energy (DOE) continue to collaborate on the Renewable Energy Program for the Agriculture and Fisheries Sector (REP AFS) to undertake programs aimed at boosting the country's energy and food security. Biofuels – bioethanol and biodiesel are included in the list of programs in the draft REP-AFS. The draft needs enhancement to include specific targets for bioethanol and biofuels, specifically on feedstocks and their contribution to environmental protection.

THIS REPORT CONTAINS ASSESSMENTS OF COMMODITY AND TRADE ISSUES MADE BY USDA STAFF AND NOT NECESSARILY STATEMENTS OF OFFICIAL U.S. GOVERNMENT POLICY

Background

On January 28, 2022, the Department of Agriculture (DA) and the Department of Energy (DOE) conducted a public consultation to finalize the Renewable Energy Program for the Agriculture and Fisheries Sector (REP-AFS) to increase the adoption and use of cost-efficient renewable energy (RE) systems and technologies in the agriculture and fisheries sector for enhanced productivity, sustainability, and environmental protection.

There are relevant laws in the formulation of the REPAFS: Agriculture and Fisheries Modernization Act or Republic Act (RA) 8435 Section 53 on Rural Energy; Agriculture and Fisheries Mechanization Law (RA 10601) Section 35 on Use of Renewable Energy, Renewable Energy Law (RA 9513), and Biofuels Act of 2006 (RA 9367).

The DA and the DOE signed a joint memorandum circular (JMC 2021-02-0001) "Formulation and Implementation of REP-AFS" to undertake RE projects. Biofuels, particularly bioethanol and biodiesel, are included in Section 3 under Bio-Energy, to wit: community-level hydrous **bioethanol** fermentation and distilling facility producing hydrous bioethanol (95 percent) as source of fuel for farm machines and other applications, and **biodiesel** production facility for producing biodiesel as fuel replacement for compression ignition engines that run farm machines, delivery trucks, etc., that can produce up to 1,000-liter capacity for consumption of farmers associations in the barangay level. Biofuels are also included in Section 4 Research and Development under the enhancement of existing technologies.

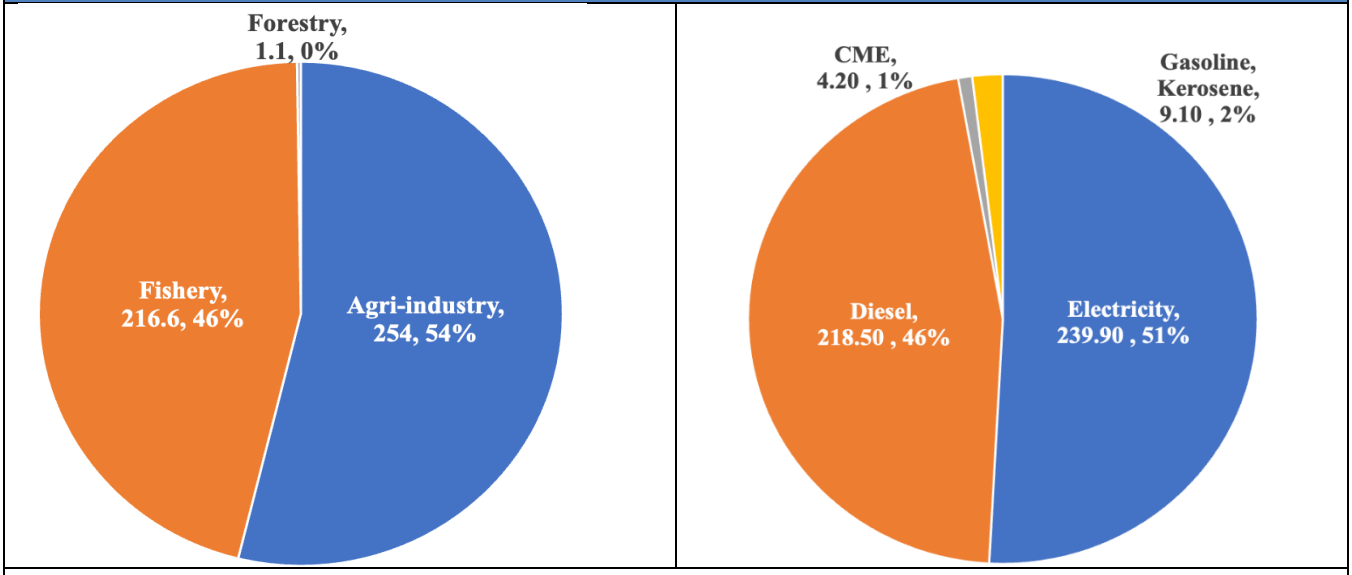
The pilot RE projects will be identified by the Joint Technical Working Group (JTWG) to be formed and co-chaired by DA-Bureau of Agricultural and Fisheries Engineering (BAFE) and DOE's Renewable Energy Management Bureau (REMB).

The draft REP-AFS provided the status of the RE utilization in the Philippine agri-fishery sector. In 2019, energy consumption was about 471.7 kTOE (kilo tons of oil equivalent) or 2% of total National Final Energy Consumption (NFEC). More than half (254 kTOE) can be attributed to the agri-fishery subsector. Per energy use, 239.9 kTOE (51 percent) accounted for electricity.

In terms of sharing in the agri-industry, 161.7 kTOE (63.66 percent) is attributed to the livestock sector, 84.3 kTOE (33.19 percent) to agri-crops products, and 7.9 kTOE (3.11 percent) to agricultural services. The livestock sector consumption includes energy usage in slaughtering activities, processing centers, and poultry and livestock facilities maintenance.

THIS REPORT CONTAINS ASSESSMENTS OF COMMODITY AND TRADE ISSUES MADE BY USDA STAFF AND NOT NECESSARILY STATEMENTS OF OFFICIAL U.S. GOVERNMENT POLICY

Figure 1. Energy Consumption of the Agri-Fishery Sector
Total = 471.7 kTOE



Source of data: Draft REP-AFS

The draft REP-AFS touched on biofuels under Component 2: Research and Development – Enhancement of Existing Technologies as specified in Section 4 of the JMC, specifically:

- Improvement and scaling-up of bioethanol and biodiesel production facilities to empower farmers' cooperation on the use of local and renewable resources for powering farm machines; and

- Use of bioethanol as well as of biodiesel as a fuel for spark-ignition and compression-ignition engines for farm and fishery machinery like power tiller, boat tractor, combine harvester, seeder and transplanter, and crop haulers.

Also suggested is the production of sanitizing alcohol using the developed hydrous bioethanol fermentation and distillation facility to assist in COVID-19 mitigation.

The draft REP-AFS has yet to indicate the specific targets for biodiesel and bioethanol, particularly in addressing the feedstocks problem. Specific targets are quantified for other RE sources like solar, hydro, wind, and biomass in terms of physical targets, percentage increases, target areas, and farmer beneficiaries.

Table 1. REP-AFS Objectives and Components	
General Objectives: The general objective of the Renewable Energy Program for Agriculture and Fisheries Sector (REP-AFS) is to increase the adoption and use of cost-efficient RE systems and technologies for enhanced productivity, environmental protection, and sustainable development for the agri-fisheries sector. Based on RE technologies and their applications, the following are the specific objectives of REP-AFS to be achieved by the end 2030:	
Specifics:	
Components	Specific Objectives
Infrastructure and Facilities Support Services	Increase the adoption and use of existing RE technologies with the following target benefits and capacities: • 484 percent increase in service are and farmers' beneficiaries with irrigation systems utilizing RE. • 662 percent increase in installed capacity (kWp) of solar-powered irrigation system (SPIS). • 118 percent increase in installed capacity (kWp) of solar PV power system. • 220 percent increase in installed units of ram pump irrigation system (RPIS). • 235 percent increase in installed units of wind-powered irrigation system (WPIS). • 44 percent increase in installed capacity (cu.m.) of biogas plants. • 46 percent increase in installed units of biomass dryers. • Conduct 8 major promotional activities such as trade fairs, RE shows, among others (one promotional activity per year).
Research and Development (R & D)	Increase number of R&D activities for different RE sources and systems used in the agri-fisheries production; • 181 percent increase in the current R&D activities (200 percent increase per year)
Human Resource Development (HRD)	Increase the number of training activities for different existing RE systems with emphasis on biomass (including biogas, solar, wind, and hydro) • 361 percent increase in the HRD activities (200 percent increase per year).
Standards Development and Enforcement	Increase in the number of developed standards for different RE machineries and equipment used in the agri-fisheries sector. • 300 percent increase in the standards development activities (one developed standard per year)
Financing and Credit Support	Increase activities to gather and secure financing and credit support for local developers, manufacturers, fabricators, end-users of RE, and producers of energy feedstock • Conduct eight financing and credit support activities (one per year)
Policy and Incentives Support	Develop support mechanisms to avail of the incentives from existing policies by local developers, manufacturers, fabricators, end-users of RE, and producers of energy feedstock; and Formulate guidelines and schemes to increase the adoption of RE technologies in the agri-fishery sector. • Formulate three guidelines and schemes

Source: Draft REP-AFS

No Section on Environmental Protection

The REP-AFS acts as a blueprint in the effective and efficient integration of RE for enhanced productivity, sustainability and environmental protection, but the draft document has yet to include a section on the environment, which is within the major objectives of REP-AFS. Programs and projects identified by the JTWG shall contribute to the Philippine commitment to the Nationally Determined Contribution (NDC).

Biofuels Environmental Impact

The DA-Sugar Regulatory Administration and the DOE commissioned several studies in the past to determine the contribution of biofuels in climate change mitigation, which can be considered in the REP-AFS to strengthen the contribution of the program to environmental protection.

Biodiesel. The University of the Philippines Los Baños (UPLB) conducted the "Life Cycle Assessment in terms of Carbon Debt and Payback Analyses, Carbon Savings and Energetics Studies of Biodiesel Production from Coconut Oil in the Philippines" completed in July 2019, which determined the current blending scenario of two percent biodiesel (B2) resulted in a 1.3 percent greenhouse gas (GHG) reduction potential.

Bioethanol. The carbon footprint and GHG emission reduction potential of bioethanol production was conducted by UPLB in 2017-2018 on four bioethanol distilleries with a carbon footprint ranging from 0.31-0.92 carbon dioxide equivalent (CO_2e) and GHG reduction potential of 65.78-88.49 percent per liter of bioethanol. The Phase 2 study (2019-2020) covering seven bioethanol distilleries revealed GHG emission reduction potential of 35.55-90.05 percent and contributed a total of 268,091 tons CO_2e per year as avoided GHG, which translated to an equivalent economic benefit of approximately PhP683.63 million ($13.67 million) per year.

Sugarcane. Study results on the environmental impact of sugar production in the Philippines covering ten sugar mills showed an average carbon footprint of 0.5775 kilograms of CO_2e per kilogram of raw sugar manufactured where cane cultivation is the main contributor due to the carbon footprints of chemical fertilizers, followed by cane hauling (fuels used). The lowest was cane processing into sugar, due to the use of bagasse for the power cogeneration of mills.

The carbon intensity of biodiesel from crude coconut oil and refined coconut oil are at 32.8 gCO_2e/MJ and 31.5 gCO_2e/MJ, respectively, with ethanol at 46.8 g CO_2e/MJ, all of which present significant GHG savings over fossil fuels (83.8 gCO_2e/MegaJoules (MJ). Clearly, the use of biofuels is more beneficial to the environment than using fossil fuels.

REP-AFS is an eight-year program (2022-2030) with total budgetary requirement of PhP17.67 billion ($325 million). While the program is aimed at boosting the country's RE sources, it should not forget

the roles of biofuels as renewable energy in reducing GHG emissions, which needs to be communicated and considered in REP-AFS. The Philippines has eight years remaining to achieve its NDC goals. Biofuels' contribution should be noted.

Attachments:

No Attachments.