Republic of the Philippines
DEPARTMENT OF AGRICULTURE
DEPARTMENT OF ENERGY

JOINT MEMORANDUM CIRCULAR NO.: JMC 2021-02-001
Series of 2021

TO : **ALL UNDERSECRETARIES, ASSISTANT SECRETARIES, BUREAU/SERVICE DIRECTORS AND HEADS OF ATTACHED AGENCIES AND CORPORATIONS OF THE DEPARTMENT OF AGRICULTURE (DA) AND THE DEPARTMENT OF ENERGY (DOE)**

ALL DA REGIONAL FIELD OFFICE DIRECTORS

ALL DOE FIELD OFFICE DIRECTORS

SUBJECT : **FORMULATION AND IMPLEMENTATION OF RENEWABLE ENERGY PROGRAM FOR THE AGRI-FISHERY SECTOR (REPAFS)**

WHEREAS, Section 53 of the Republic Act (RA) No. 8435 or the *"Agriculture and Fisheries Modernization Act of 1997"* mandates the DA to coordinate with the DOE, the Department of Public Works and Highways (DPWH), the National Electrification Administration (NEA), and the National Power Corporation (NAPOCOR) for the identification and installation of appropriate types of energy sources particularly in the use of non-conventional energy sources for the locality in order to enhance agriculture and fisheries development in the area;

WHEREAS, Section 35 of the RA No. 10601 or the *"Agricultural and Fishery Mechanization (AFMech) Law"* directs the DA, in coordination with the DOE, Department of Science and Technology (DOST), State Universities and Colleges (SUC), and the private sector, to undertake research and extension activities to enhance the use of renewable and nonconventional energy in agricultural and fisheries operations;

WHEREAS, in addition to its other powers and functions, the DOE is empowered under Section 32 of the RA No. 9513 or the *"Renewable Energy Act of 2008"* to: i) conduct technical research, socio-economic and environmental impact studies of renewable energy projects for the development of sustainable renewable energy systems; ii) supervise and monitor activities of government and private companies and entities on renewable energy resources development and utilization to ensure compliance with existing rules, regulations, guidelines and standards; and iii) provide information,

consultation and technical training and advisory services to developers, practitioners and entities involved in renewable energy technology and develop renewable energy technology development strategies;

WHEREAS, in view of the provisions of the above laws, the DA and DOE entered into a Memorandum of Agreement (MOA) dated 06 August 2020, for the formulation and implementation of the Renewable Energy Program for the Agriculture and Fishery Sector (REPAFS). The REPAFS shall act as the blueprint in the effective and efficient integration of renewable energy (RE) in agriculture and fishery sectors, and the same shall serve as one of the components of the National Renewable Energy Program (NREP).

NOW, THEREFORE, for and in consideration of the foregoing premises, the DA and DOE hereby jointly issue the following guidelines for the proper implementation of REPAFS.

Section 1. *Goals and Objectives* - The goal of the REPAFS is to promote the use of RE in the agriculture and fishery sector for enhanced productivity, sustainability, and environmental protection. As such, it shall have the following objectives:

1) Strengthen, expand, and promote the implementation of existing RE programs, projects, and technologies using solar, wind, hydro, small-scale geothermal, and biomass as alternative energy source for the agri-fishery sector, thereby reducing the cost of production and the environmental impact caused by the use of conventional energy sources; and encourage continuing technology innovation through Public-Private Partnerships (PPPs), Joint Venture Arrangements (JVAs) following relevant provisions of the National Economic Development Authority Guidelines on Joint Venture; technology business incubation, contract research, management contract and other relevant legal instruments consistent with applicable rules, regulations, and laws.

2) Develop new RE technologies for the agri-fishery sector in collaboration with Research and Development Institutions (RDIs), SUCs, and the private sector;

3) Promote human resource development specializing in RE for agri-fishery sector through capacity development, and deployment of Agricultural and Biosystems Engineers (ABE), trained technicians, farmers, fisherfolk, farm workers and other concerned stakeholders in collaboration with the Technical Education and Skills Development Authority (TESDA), Commission on Higher Education (CHED), Department of Labor and Employment (DOLE), and the Department of Education (DepEd);

4) Promote the development and enforcement of standards on the design, construction, and testing of RE machinery and structures for the agri-fishery sector; and

5) Provide technical assistance and support services to manufacturers, fabricators, and suppliers of locally-produced equipment and components of RE-powered agri-fishery systems.

Section 2. *Program Components* - The REPAFS shall have the following components: 1) Promotion of Existing RE Technologies; 2) Research and Development; 3) Standards Development and Enforcement; 4) Human Resource Development; and 5) Assistance to Local Manufacturers, Fabricators and Suppliers.

Section 3. *Promotion of Existing RE Technologies* - The use of appropriate RE technologies for various agricultural and fishery operations such as drying and other heat-based applications; farm electrification or power supply for production and processing facilities and machinery; fuel for engines used in irrigation, mechanization of farm operations, and other applications, shall be promoted. RE technologies shall include, but not limited, to the following:

1) Bio-Energy -

   a) Indirect/Direct-fired Biomass furnace as heat source for: (a) agri-fishery commodity drying; (b) production of clean hot air for poultry brooding farm (c) cooking and baking operations in rubber, cottage and other processing industries; and (e) steam boiler in agricultural processing operations like poultry dressing plants, slaughterhouses, among others.

   b) Biomass gasifier as heat source for: (a) agri-fishery commodity drying; (b) oven-baking in bread-making industries; and (c) fuel for engine-driven irrigation pumps, small grain and feed mills, off-grid farm electrification, and other stationary engine applications in the farm.

   c) Biogas plant producing fuel for: (a) heating applications like brooding, space heating, and others; and (b) fuel for mechanical and electrical power generation for small poultry and livestock farm applications such lighting, water pumping, ventilation, and many others.

   d) Community-level hydrous bioethanol fermentation and distilling facility producing hydrous bioethanol (95%) as source of fuel for farm machines and other applications.

   e) 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 1000-liter capacity for consumption of farmers associations in the barangay level.

   f) Biomass torrefaction machine/equipment that improves the quality of biomass feedstock such as sugar cane bagasse and others as fuel for various applications.

   g) Biomass carbonization with the heat recovery system for processing agricultural residues (rice hull, peanut shells, corn cobs, tree branches, etc.) into biochar as soil conditioner and utilizing the generated heat as alternative energy source for cooking, steaming, baking, roasting, pasteurizing, space heating, and other food processing operations.

h) Production of energy crops, like "Bana" grass, "Ipil-ipil", "Madre de Cacao", and other invasive trees, jatropha, sweet sorghum, and nipa, in non-agricultural lands; and the collection and processing of agricultural, forest and fishery wastes like rice husks, corn cobs and stalks, sugar cane trash, coconut husks and leaves and branches, pineapple peel, banana peel, and other organic materials to be used as biomass feedstocks for biogas plants.

2) Solar Energy - Solar collectors for heating and drying purposes; and Photovoltaic (PV) System or Solar Power System to supply electrical power for crop irrigation systems, farm electrification, agri-fishery production and processing plants; and aquaculture aeration systems.

3) Wind Energy - Wind pumps for domestic, poultry, and livestock water supply including pressurized and non-pressurized irrigation systems for high-value crops in greenhouses, fruit tree orchards, and vegetable farms; wind turbines for electricity generation in off-grid and coastal areas, for lighting and power supply of residential houses of farmers and fisher folks; and wind-powered aeration systems for aquaculture.

4) Hydropower - Pico-hydro and Micro-hydro for electricity power generation for grain threshing/milling operations, and other agri-fishery production systems and processing plants; hydraulic ram pumps for domestic water supply system in hilly and mountainous regions, and for irrigation system of vegetable farms; water wheels as water pump and electricity power generation facility in farming communities; and screw hydro turbines as water pump and electricity power generation facility for agri-fishery production systems and processing plants.

5) Geothermal Energy - Geothermal and steam heated crop dryers.

Furthermore, the implementation of existing RE programs, projects and technologies of the DA, DOE, local government units (LGU), and other concerned government agencies, such as Solar-Powered Irrigation Systems (SPIS), biomass gasifiers, and small-scale geothermal energy to supply heat, mechanical, and electrical power for farm machinery, post-harvest facilities, and greenhouses, shall likewise be strengthened or expanded in all feasible sites of the country.

Section 4. *Research and Development* - Research and development activities shall consider the development of new technologies and the enhancement of existing ones. Priority areas for research and development shall include, but are not limited, to the following:

1) Local RE Technology Development -

a) Development of decentralized biomass gasification systems as electrical power source for municipal-level rice and corn milling plants as well as for community-level feed-milling facility.

b) Development of local biogas equipment for heating applications in poultry and livestock farm such as biogas burner, heater, and flare, and biogas-fueled engine including biogas filter and conditioning units for cleaning the gas.

c) Development of small fast-running wind pumps with evacuating tanks to serve as power drive for transfer pump in low head streams and rivers, and irrigation canals for irrigation.

d) Development of small wind turbines for use either as hybrid unit with solar or as stand-alone unit to supply electricity for lighting and for water pumping in poultry and livestock farms, and even in feedlot areas.

e) Development of water wheels in small streams and rivers, including irrigation canals, for irrigation and for lighting.

f) Development of off-shore, micro wind turbine for lighting fish pens, and other similar fishing facilities.

g) Establishment of solar, wind, and biomass-powered battery charging stations for energizing farming communities, and for use in agriculture.

h) Development of biomass torrefaction and pelleting machines for the production of pelleted and briquetted fuel for farm machines.

i) Harnessing spring hot water or exhaust steam from geothermal plants for large-scale crop drying facility.

j) Harnessing wave energy to produce electricity for lighting in coastal fishing areas, for transfer pump operation in hatcheries, and other similar power applications.

k) Harnessing the use of municipal solid wastes, like pelleted refused derived fuel, as source of fuel to power farm machines and for heating systems in agricultural and other agri-fishery processing applications.

l) Development of other local RE technologies in reference to global existing technologies that are non-existing in the country.

2) Enhancement of Existing Technologies -

a) Improvement and expanded use of existing biomass furnaces for various heating applications like fruit and fish drying, and other agri-fishery produce that requires heat for drying.

b) 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.

c) Use of bioethanol as well as of biodiesel as 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.

d) Use of biochar and heat co-generation system for enhance food and energy security at farming households' level.

3) Consolidation and/or evaluation of different local and international RE technologies that are being implemented in the agri-fishery sector of the country such as solar, wind, hydro and small scale geothermal powered technologies, as well as biomass and biogas technologies.

Section 5. *Standards Development and Enforcement* - The Bureau of Agriculture and Fisheries Standards (BAFS), in coordination with the Bureau of Philippine Standards (BPS) of the Department of Trade and Industry (DTI), Bureau of Agricultural and Fisheries Engineering (BAFE), DOE and other concerned government agencies, shall come up with priority standards on RE-powered agricultural and fisheries machinery and facilities under the Philippine National Standard/Philippines Agricultural and Biosystems Engineering Standards (PNS/PABES). The enforcement of these standards, including that of the existing ones shall be undertaken primarily by the DA, with assistance from the DOE and other regulatory agencies.

The BAFE, pursuant to its mandate under RA No. 10601 shall:

1) Coordinate and facilitate AMTEC testing and evaluation of RE-powered agricultural and fisheries machinery;

2) Issue Permit to Operate to local manufacturers, fabricators, and suppliers of RE powered agricultural and fishery machinery and equipment;

3) Issue Certificate of Conformity to RE-powered agricultural and fisheries machinery that are compliant to the PNS/PABES;

4) Monitor the compliance of local manufacturers, fabricators, and suppliers of RE technologies to PNS/PABES on the Guidelines on After-Sales Service; and

5) Coordinate the implementation of registration of ownership of newly-bought RE-powered agricultural and fisheries machinery by the local manufacturers, fabricators, and suppliers of RE technologies to the LGUs pursuant to Section 19, Rule 19.1 of the IRR of RA No. 10601.

Section 6. *Human Resource Development* - The DA and DOE, in collaboration with TESDA, CHED, DOLE, DepEd, and other concerned government agencies and private institutions, shall undertake capacity development of ABEs, technicians, farmers, fisherfolk, farm workers, agricultural and fisheries machinery operators, and other concerned stakeholders to support the implementation of REPAFS. Specifically, the following activities shall be undertaken:

1) Rolling out of the existing Training Regulations (TRs) on Solar Powered Irrigation System Operation and Maintenance (NC II) and Biogas Systems Installation (NC III) through the capacity development and deployment of ABEs as trainers and competency assessors, and the accreditation by TESDA of the training centers and competency assessment centers in strategic locations of the country;

2) Development of additional TRs on RE for the agri-fisheries sector;

3) Training of farmers, fisherfolk, farm-workers, and machinery operators on the use, operation and maintenance of RE powered machines, equipment facilities and other livelihood projects;

4) Integration/mainstreaming of RE application in agri-fisheries sector in the K-12 program by DepEd; and

5) Enhancement of the integration of RE program into the curriculum of undergraduate and post graduate degrees in ABE, agriculture, fisheries, and other related courses.

Section 7. *Assistance to Local Manufacturers, Fabricators and Suppliers of RE* Equipment *and Machinery* - The BAFE shall make an inventory of all existing local manufacturers, fabricators, and suppliers of RE equipment and machineries all over the country. Furthermore, the DA and DOE shall provide the following assistance:

1) Technical assistance in the production of RE equipment and machineries developed;

2) Technical assistance in availing AMTEC test and the issuance certification of conformity on ready-to-manufacture local RE equipment and machineries with PNS/PABES, as well as the accreditation/registration of Local Manufacturers, Fabricators and Suppliers pursuant to the IRR of both the RA 10601 and RA 9513;

3) Fiscal and non-fiscal incentives pursuant to RA No. 9513, subject to the compliance by such local manufacturers, fabricators, and suppliers with the DOE's rules and regulations governing the registration of local manufacturers, fabricators, and suppliers of RE equipment and machineries; and

4) Assistance in the promotion and marketing of RE equipment and machineries developed by accredited/registered local manufacturers, fabricators and suppliers.

Section 8. *Pilot Projects* - The DA and DOE shall jointly undertake Pilot RE projects in strategic areas of the country, and these include but are not limited to the following:

1) Use of biomass gasifier for driving irrigation pumps, small rice and corn mills, as well as for off-grid electrification in rice, corn, and sugar cane farms;

2) Hydrous bioethanol fermentation and distillation facility for the production of fuel blend for farm machines and other purposes;

3) Demonstration model of a small biogas plant for heat and power applications as well as a facility for wastewater treatment and the use of dried sludge as bio-fertilizer and/or soil conditioner;

4) Use of solar-powered system for crop irrigation, aquaponics, and hydroponics, as well as for poultry egg incubators and hatchers; and

5) Other agriculture and fishery-related technologies which may later be identified by the JTWG.

Section 9. *Formulation of REPAFS* - The DA, through the BAFE, shall spearhead the formulation of the REPAFS with the set of goals and objectives and components mentioned above, and in collaboration with DOE and other concerned government agencies and private sector. The REPAFS as a component of the NREP shall form part of the DA's Agricultural and Fishery Modernization and Industrialization Plan, and the National Agri-Fisheries Mechanization Plan. The REPAFS shall have an aggregation of regional and provincial/city local plans and targets. Hence, the DA, with assistance from the DOE, shall encourage the LGUs to integrate the REPAFS to the local development plans.

Section 10. *Roles and Responsibilities of the DA and DOE* - The roles and responsibilities of the DA and DOE relative to the implementation of REPAFS are as follows:

1) Department of Agriculture:

   a) Integrate the use of cost-efficient RE for power and non-power applications in the planning and implementation of agri-fishery mechanization and other relevant plans, programs, projects and activities by all its concerned bureaus, attached agencies/corporations, banner programs and regional field offices.

   b) Regularly assess/account and submit to the DOE the contribution of RE involving both non-power and power applications in the agriculture and fishery industry.

   c) Support the commercial plantation of biomass feedstock for small scale and industrial application of RE through farmers' cooperatives and associations.

   d) Streamline processes of certifications to biofuel producers under the REPAFS projects vis-à-vis Chapter II of JAO-2008-01, relevant provisions of RA Nos. 9513, 11234, and DOE Department Circular DC2019-10-0013.

   The BAFE shall serve as the DA focal bureau on RE for agri-fishery sector and shall coordinate and monitor the planning and implementation of the REPAFS plans, programs, projects and activities and the monitoring and evaluation of the manufacturing/fabrication/supply and use of RE-powered agricultural and fishery machinery and equipment;

2) Department of Energy:

a) Provide technical expertise to the DA in the development and implementation of REPAFS.

b) For purpose of availing incentives under RA No. 9513, administer the accreditation or registration of: a) manufacturers, fabricators and suppliers of locally-produced RE equipment and components in the agri-fishery sector; b) RE projects in the agri-fishery sector for own-use and/or non-commercial operations; and c) farmers engaged in plantation of biomass resources.

c) Provide technical assistance in the application of RE systems and technologies in agriculture, aquaculture, and agro-industrial processes.

Section 11. *Joint Technical Working Group* - A Joint Technical Working Group (JTWG) shall be constituted by DA and DOE which shall be composed of the heads or the duly designated representatives of the following operating units of the DA and DOE :

Department of Agriculture:

1) Bureau of Agricultural and Fisheries Engineering (BAFE), Lead
2) Bureau of Fisheries and Aquatic Resources (BFAR)
3) Philippine Center for Postharvest Development & Mechanization (PHilMech)
4) Philippine Rice Research Institute (PhilRice)
5) Philippine Coconut Authority (PCA)
6) Sugar Regulatory Administration (SRA)
7) Bureau of Animal Industry (BAI)
8) Bureau of Soils and Water Management (BSWM)
9) Agricultural Training Institute (ATI)
10) Bureau of Agricultural Research (BAR)
11) Bureau of Agriculture and Fisheries Standards (BAFS)
12) Philippine Fiber Industry Development Authority (PhilFIDA)
13) National Dairy Authority (NDA)
14) DA - Project Development Service
15) DA - Regional Field Office III - Regional Agricultural Engineering Division (RFO-RAED)

Department of Energy:

1) Renewable Energy Management Bureau (REMB)
2) Energy Policy and Planning Bureau (EPPB)
3) Investment and Promotion Office (IPO)
4) National Renewable Energy Board (NREB)
5) Luzon Field Office (LFO)
6) Visayas Field Office (VFO)
7) Mindanao Field Office (MFO)

The JTWG shall be chaired by BAFE and co-chaired by REMB. Moreover, the BAFE shall serve as the secretariat of the JTWG.

The JTWG shall have the following functions:

1) Provide technical support in the formulation and implementation of the REPAFS;

2) Discuss and address policy, technical and other related concerns on the implementation of this Joint Memorandum Circular;

3) Review and recommend on RE project proposals, implementation status of existing RE programs, activities, and projects;

4) Validate and recommend issues and concerns arising during the planning, implementation, and monitoring of RE projects;

Section 12. *Funding* - The funding necessary for the implementation of this Joint Memorandum Circular shall be charged to the available funds of the DA and DOE, and shall be incorporated in the National Expenditure Program from 2022 and onwards. Funding sources from official development assistance and other funding sources shall likewise be tapped and explored.

Section 13. *Effectivity* - This Joint Memorandum Circular shall take effect immediately.

Done this _____ day of FEB 16 2021 2021.

WILLIAM D. DAR, PhD.
Secretary, DA

DEPARTMENT OF AGRICULTURE
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ALFONSO G. GUSI
Secretary, DOE

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