

**Feasibility Study on the Nationwide Deployment of Modularized  
Village-Scale Ethanol Biorefineries using Nipa Sap**

**Terms of Reference (TOR)  
for the  
Feasibility Study on the Nationwide Deployment of Modularized  
Village-Scale Ethanol Biorefineries using Nipa Sap**

**1. BACKGROUND/RATIONALE**

**1.1. Contracting Authority**

The General Appropriations Act (GAA) for 2014 has allocated the amount of Four Hundred Million Pesos (Php 400,000,000.00) for the conduct of feasibility studies (F/S) to be administered by the National Economic and Development Authority (NEDA). Thus, the Central Luzon State University (CLSU) and Mariano Marcos State University (MMSU) submitted the subject proposal to NEDA for consideration and inclusion under the said fund.

NEDA shall be the Executing Agency while CLSU shall be the Principal Implementing Agency in collaboration with MMSU. The proposed project is consistent with CLSU and MMSU's major programs/projects/activities (PPAs).

**1.2. Project Profile**

The Philippines is a major producer and user of biofuels. The Philippines Biofuels Act of 2006 (Republic Act 9367) requires the blending of biodiesel and ethanol in all locally distributed diesel and gasoline (currently at 2% and 10%, respectively). As the country is the world's top coconut oil producer, there have been no compliance issues meeting the mandated biodiesel blend; compliance with the 10% mandated ethanol blend in gasoline, however, is a big problem for the industry. Inadequate capacity of existing sugarcane distilleries, low productivity, and high production costs has eroded the competitiveness of locally grown sugarcane and the country currently imports more than 83% of its ethanol requirement.

This is a proposal from CLSU and MMSU to engage the services of independent consultants to conduct a feasibility study to deploy low cost ethanol biorefineries, in select areas of the Philippines that have Nipa feedstocks available to produce ethanol and are in close proximity of large commercial scale ethanol distilleries. These biorefineries, costing no more than Php 200K each to deploy, are capable of using not only sugar cane, but also alternative feedstocks such as nipa palm sap, to produce fuel-grade ethanol. With each ethanol biorefinery capable of producing 60 L of fuel grade ethanol per day, 5,000 of these plants - scattered throughout the Philippines where there are already established large-scale distilleries, - can supply the current shortfall in the bioethanol needs of the country, at the fraction of the cost of building just ONE centralized, large scale bioethanol refinery.

CLSU and MMSU affirm that the project is consistent with the mandate of both universities to provide Extension and Outreach to the community. These are major activities under the umbrella of State Universities and Colleges primary tripartite mandate to provide Research, Instruction and Extension. Likewise, it is generally accepted that State Universities serve a

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primary role in promoting human development and improving the Philippine economy's competitiveness.

The proposed project under the F/S is congruent with the Strategic Core Investment Programs and Projects under the 2011-2016 Revalidated Public Investment Program, Chapter 4: Competitive and sustainable agriculture and fisheries to wit:

- 4.2 Philippine Rural Development Program (PRDP) - Agricultural enterprises developed
- 4.3 Convergence on Value-Chain Enhancement for Rural Growth & Empowerment (ConVERGE)
  - Rural enterprises established
- 4.4 Agribusiness Clusters Engagement Strategy (ACES) – Rural enterprises

### 1.3. Relevant Country/Sector Contexts

The deployment project, if proven feasible and implemented, will contribute significantly to the realization of the goals of the Philippine Development Plan 2011-2016 that adopted a framework of inclusive growth: high growth that is sustained, generates mass employment, and reduces poverty in rural areas of the Philippines. Most importantly, it will make the country self-sufficient in ethanol.

### 1.4. Current State of the Relevant Sector

The Philippine government considers the use of biofuels as one of the key ways to reduce carbon dioxide emissions and lessen the country's dependence on foreign oil. Republic Act 9637 (2006 Philippine Biofuels Act), mandated the use of 10% Ethanol as gasoline oxygenate in 2011. Under the Implementing Rules and Regulations of the Act, the Philippine National Standards (PNS) specified that the ethanol used in blending should be 99.3% anhydrous. The technical requirements needed to produce anhydrous ethanol severely limited the participation of village-scale industries in the production of fuel-grade ethanol – the very sector that the legislation purportedly wants to benefit. This is the challenge that anchored the biofuel R & D initiatives at MMSU and CLSU: to develop adoptable and adaptable technologies that would allow ordinary feedstock growers and gatherers to participate in the vertical integration of this nascent industry. These two State Universities have developed fermentation and distillation technologies to produce fuel-grade ethanol that can be used as oxygenate and fuel blend to gasoline.

From the very beginning, the R&D programs of MMSU and CLSU have had a strong advocacy towards poverty alleviation, livelihood creation, and climate change mitigation. The collaboration of MMSU and CLSU resulted in the development of village-scale ethanol biorefineries that are capable of producing fuel grade hydrous ethanol. Costing no more than a tricycle – the quintessential entry level means of livelihood - these small scale ethanol biorefineries are the antithesis of the large bioethanol refineries that have been built costing billions of pesos but are now floundering. They had the wrong business model for the Philippines.

In a country of 7107 islands, the production of bioethanol must be distributive and scattered rather than centralized. Compared to large-scale bioethanol plants, these enterprises require less financial outlay to establish and are less affected by financial economic downturns. Most importantly, under a small-scale business model, village-level participants stand to benefit

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from the higher levels of vertical integration in the bioethanol industry. Instead of selling a raw product such as juices to large bioethanol plants, they can profit from the sale of a much higher value product – fuel grade ethanol. Using Nipa sap as primary feedstock, sugars from the sap are converted to ethanol that is then distilled to a concentration of 95%. This ethanol, although containing 5% water, has been proven to be just as good as anhydrous ethanol when used as gasoline oxygenate to power spark-ignition engines. These enterprises would generate employment and alleviate rural poverty through the development of village level bio-ethanol industry.

CLSU and MMSU believe that given the state of their technology, the low-cost ethanol biorefinery is ready for nation-wide deployment as commercial enterprises in areas where ample supply of feedstocks such as nipa sap are available. These areas should be within a reasonable proximity to already existing large, commercial scale distilleries.

### 1.5. Related projects/programs and other donor activities

More recently, MMSU and CLSU have sought, and received, funding from US-AID to deploy their technology in three pilot locations - Pamplona, Cagayan; Batac, Ilocos Norte; and Mulanay, Quezon - to process nipa sap, sweet sorghum and waste coconut water, respectively. The group received funds from USAID in November, 2014. Their USAID proposal is one of only three that were funded, out of 35 submitted applications under the USAID-Stride Carwin Program. *The major conclusion of the funded project is that Nipa sap is the most promising alternative feedstock for bioethanol production in rural areas of the Philippines.*

## 2. OBJECTIVE, PURPOSE & EXPECTED RESULTS

### 2.1 Overall objective of the project/study

Objectives of the Feasibility Study

The main objective of the feasibility study is to identify and analyse market, organizational/technical and financial requirements related to the deployment of village-scale bioethanol plants in selected areas of the Philippines where Nipa stands are available and are in proximity of existing large scale ethanol distilleries. If proven feasible, proponents will apply for a grant to deploy village-scale biorefineries country-wide. Value/Options Analysis including risk analysis will be integrated in the study.

### 2.2 Specific objectives

Specifically, the Feasibility Study will:

- i) Identify areas of the country capable of supplying nipa feedstocks to operate a village-scale ethanol biorefinery in close proximity of large-scale commercial distilleries;
- ii) Conduct market research on the size and demographics of the bioethanol market;
- iii) Identify existing distilleries with large capacity, but lacking in outputs (in terms of quantity), as possible market/buyer for the hydrous ethanol with 95% grade;
- iv) Develop project specifications on the deployment of a village-scale modular bioethanol plant in these areas;
- v) Conduct Cost Benefit Analysis; and
- vi) Prepare Feasibility Report.

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### **2.3 Expected Results**

The successful deployment of village-scale bioethanol plants throughout the country where ample feedstocks are available will result in:

- Participation of rural communities in the vertically-integrated production of bioethanol.
- Participation of small-scale producers in higher levels of vertical integration in the bioethanol industry; i.e., instead of selling a raw product such as juices to large bioethanol plant, they can profit from the sale of fuel-grade ethanol.
- Generation of employment and alleviation of rural poverty through the development of village level bioethanol industry.
- Maximization of the use of sustainable feedstocks that do not create issues of food vs fuel.
- Reduction in the amounts of ethanol importation and contribute to the ethanol self-sufficiency goals of the country.

All the above expected results buttress the principal goal of the Philippine Development Plan 2011-2016 - inclusive growth, which is high growth that is sustained, generates mass employment, and reduces poverty in the rural communities.

### **3. ASSUMPTIONS & RISKS/LIMITATIONS**

#### **3.1 Assumptions underlying the project intervention**

- There is strong interest in developing the bioethanol industry in the Philippines as evidenced by foreign and local investments in 15 large-scale bioethanol plants in various stages of planning and construction.
- The demand for bioethanol will remain strong in the foreseeable future due to the requirements of the 2006 Biofuels Act and the expanding economy of the country.
- Philippine Development Plan 2011-2016 targets rural communities in its program of inclusive growth, which is high growth that is sustained, generates mass employment, and reduces poverty.

#### **3.2 Limitations**

The proposed F/S project will be limited to the identification and analysis of the bioethanol market for fuel grade ethanol produced at the village-level, as well as organizational/technical and financial issues related to the deployment of village-scale bioethanol plants in selected areas of the Philippines.

### **4. SCOPE OF WORKS**

The scope of works shall cover but not be limited to the conduct of a nipa plantation study, processing study, environmental study, social study, marketing study, financial study and legal study. Value/Options Analysis including risk analysis will be integrated in the study on the deployment of ethanol biorefineries using Nipa sap.

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### 4.1 General

This study shall cover the following: i.) identification of areas of the country capable of supplying feedstock to operate a village-scale ethanol biorefinery, ii.) conduct market research on the size and demographics of the bioethanol market, iii.) develop project specifications on the deployment of a village-scale modular bioethanol plant in these areas, and iv.) conduct Cost Benefit Analysis.

#### 4.1.1 Proponents, Target Group and Beneficiaries

Central Luzon State University and Mariano Marcos State University are end users of the F/S and potentially, the implementing agency of biorefinery deployment. Both institutions are comprehensive universities and leaders in bio-ethanol and alternative energy research. As State Universities, the research programs of both institutions have long histories of strong advocacy on poverty alleviation, livelihood and job creation, and climate change mitigation.

The partnership of MMSU's Bioethanol Team and CLSU's Alternative and Renewable Energy Center (AREC) group have developed and fabricated a modular Village Scale Fermentation and Reflux Distillation System costing no more than Php 200,000. This system was publicly unveiled on February 4, 2014. This village scale bioethanol plant is capable of producing 60 liters of hydrous azeotropic ethanol per day and can handle multiple feedstock sources. More recently, an improved model, specific for Nipa sap, was deployed in Pamplona, Cagayan on October 7, 2014. More deployments are planned in the next 12 months with funding from PhilRice and USAID, the target group and beneficiaries of which are the small-scale ethanol producers, including Nipa sap producers, harvesters and processors; copra producers who have no specific use for the waste coco water by-product; and sweet-sorghum farmers. Producers of other feedstocks such as sugar cane, cassava, corn, whose products that are damaged or are in excess of current consumption needs, are also potential beneficiaries.

#### 4.1.2. Geographical area to be covered

The study will encompass all of the Administrative Regions of the Philippines that have potential bioethanol feedstocks except NCR. The identification of more specific areas will follow after consultation with Provincial field offices of Governmental Agencies such as the Department of Agriculture and Department of the Environment and Natural Resources and will comprise the final report. Initially, therefore, this will include:

CAR	Region I	Region II	Region III
<ul style="list-style-type: none"> <li>Abra</li> <li>Apayao</li> <li>Benguet</li> <li>Ifugao</li> <li>Kalinga</li> <li>Mountain Province</li> </ul>	<ul style="list-style-type: none"> <li>Ilocos Norte</li> <li>Ilocos Sur</li> <li>La Union</li> <li>Pangasinan</li> </ul>	<ul style="list-style-type: none"> <li>Batanes</li> <li>Cagayan</li> <li>Isabela</li> <li>Nueva Viscaya</li> <li>Quirino</li> </ul>	<ul style="list-style-type: none"> <li>Aurora</li> <li>Bataan</li> <li>Bulacan</li> <li>Nueva Ecija</li> <li>Pampanga</li> <li>Tarlac</li> <li>Zambales</li> </ul>
Region IV-A	Region IV-B	Region V	Region VI
<ul style="list-style-type: none"> <li>Cavite</li> <li>Laguna</li> <li>Batangas</li> </ul>	<ul style="list-style-type: none"> <li>Marinduque</li> <li>Occidental Mindoro</li> </ul>	<ul style="list-style-type: none"> <li>Albay</li> <li>Camarines Norte</li> </ul>	<ul style="list-style-type: none"> <li>Aklan</li> <li>Antique</li> <li>Capiz</li> </ul>

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<ul style="list-style-type: none"> <li>• Rizal</li> <li>• Quezon</li> </ul>	<ul style="list-style-type: none"> <li>• Oriental Mindoro</li> <li>• Romblon</li> <li>• Palawan</li> </ul>	<ul style="list-style-type: none"> <li>• Camarines Sur</li> <li>• Catanduanes</li> <li>• Masbate</li> <li>• Sorsogon</li> </ul>	<ul style="list-style-type: none"> <li>• Guimaras</li> <li>• Iloilo</li> <li>• Negros Occidental</li> </ul>
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Region VII	Region VIII	Region IX	Region X
<ul style="list-style-type: none"> <li>• Bohol</li> <li>• Cebu</li> <li>• Negros Oriental</li> <li>• Siquijor</li> </ul>	<ul style="list-style-type: none"> <li>• Biliran</li> <li>• Eastern Samar</li> <li>• Leyte</li> <li>• Northern Samar</li> <li>• Samar</li> <li>• Southern Leyte</li> </ul>	<ul style="list-style-type: none"> <li>• Zamboanga del Norte</li> <li>• Zamboanga del Sur</li> <li>• Zamboanga Sibugay</li> </ul>	<ul style="list-style-type: none"> <li>• Bukidnon</li> <li>• Camiguin</li> <li>• Lanao del Norte</li> <li>• Misamis Occidental</li> <li>• Misamis Oriental</li> </ul>

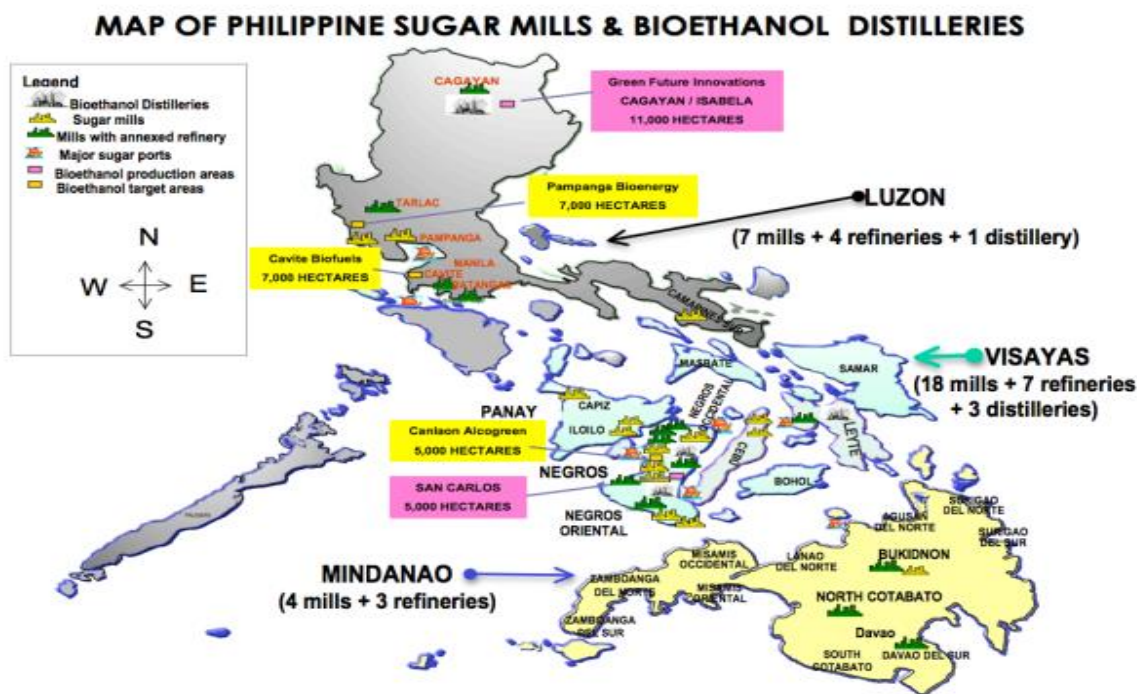
Region XI	Region XII	Region XIII	ARMM
<ul style="list-style-type: none"> <li>• Compostela Valley</li> <li>• Davao del Norte</li> <li>• Davao del Sur</li> <li>• Davao Oriental</li> </ul>	<ul style="list-style-type: none"> <li>• Cotabato</li> <li>• Sarangani</li> <li>• South Cotabato</li> <li>• Sultan Kudarat</li> <li>• General Santos City</li> </ul>	<ul style="list-style-type: none"> <li>• Agusan del Norte</li> <li>• Agusan del Sur</li> <li>• Dinagat Island</li> <li>• Surigao del Norte</li> <li>• Surigao del Sur</li> </ul>	<ul style="list-style-type: none"> <li>• Basilan</li> <li>• Lanao del Sur</li> <li>• Maguindanao</li> <li>• Shariff Kabunsuan</li> <li>• Sulu</li> <li>• Tawi-tawi</li> </ul>

From among the areas listed above, the study should be able to identify at least four (4) locations each from Luzon, Visayas and Mindanao (total of 12 locations). Each location should have at least 100 hectares of Nipa plantation. Each location should, as much as possible, be in close proximity to a large bioethanol distillery such as those, but not limited, to those shown in the accompanying map below as there may be other distilleries that were not identified in the map. If on the other hand, the identified areas are not in close proximity to a large distillery, the study should be able to identify an area that is central to the four locations and then be able to include in the f/s options that will cater to the distillation of the 95% hydrous ethanol produced by the village-scale biorefineries into higher grade ethanol as specified by law for fuel consumption (e.g. construction of large distillery, transportation of hydrous ethanol to nearest distillery, procurement of a device that converts hydrous to non-hydrous ethanol).<sup>1</sup>

<sup>1</sup> Note that there has not been any large distillery identified yet in Mindanao



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### 4.1.3 Market Research Study

The study shall provide an economic and financial analysis of deploying a village-scale biorefinery. The input data that could be provided by the proponent in the conduct of this study are, among others, as follows: i) cost of a biorefinery, ii) capacity of the biorefinery, and iii) required plantation area for every biorefinery. Labor cost for harvesting the nipa sap and the cost of producing a litre of 95% grade hydrous bioethanol is area-specific as this will depend on the labor cost (harvesting nipa sap and operating the village-scale biorefinery) and the cost of fuel (firewood, charcoal, coconut husk, etc.) that will be used in distillation. The study should also include the risks that may be involved in operating small ethanol biorefineries. Finally, the study should be able to identify possible large distilleries where the produced ethanol from the small biorefineries could be marketed for further distillation into a higher grade ethanol.

### 4.1.4 Project Specification Study

For each location that will be identified, engineering packages for deployment of ethanol biorefineries should be specified, which includes the cost of fabricating and installing the village-scale biorefinery, transport cost of the fabricated biorefinery from the place of fabrication to the project site, manpower required in operating the biorefinery, trainings required in operating the biorefinery, and precautionary measures needed during the operation of the biorefinery in order to avoid accidents.

### 4.1.5 Cost –Benefit Study

Simple cost and return analysis should be conducted. It should present the benefits (tangible and intangible benefits) that could be derived out of the deployment and of operating the

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village-scale biorefinery. In this regard, the study will consider the following; harvesting nipa sap and processing it into hydrous ethanol as source of income for the village people, need for the village people to form an association/organization for them to effectively and efficiently operate and manage the small biorefinery, and computation on return on investments.

### 5. TIMELINES AND DELIVERABLES

#### 5.1 Commencement Date and Period of Implementation

The Study shall be completed within a period of twelve (12) months, commencing from the date of receipt of the Notice to Proceed (NTP). Refer to **ANNEX A** for the table activities/expected outputs.

#### 5.2 Table of Deliverables and Timelines

A *detailed Work and Financial Plan* (WFP) shall be submitted by the Consulting Firm to CLSU for review (copy furnished NEDA for monitoring purposes and payment processing) within five (5) working days from the date of commencement as indicated in the NTP.

The deliverables for the subject study as enumerated below shall be submitted by the Consultant in four (4) hard copies to CLSU for review and two (2) hard copies to NEDA for monitoring purposes. An electronic/soft copy shall also be submitted to CLSU and NEDA.

All analyses and findings resulting from this study shall be documented in a formal report that shall be prepared in a comprehensive manner, supported with sufficient details and information.

Deliverables	Timeline
Work and Financial Plan	Five (5) working days from the date of commencement as indicated in the NTP
Draft Inception Report	1 month after the receipt of NTP
Inception Report	2 months after from the receipt of NTP
Monthly Status Reports	Monthly until the end of tenth month (excluding the sixth month), within seven (7) calendar days from the end of agreed month-period
Interim Report	6 months after from the receipt of NTP
Draft Final Report	11 months after from the receipt of NTP
Final Feasibility Report	12 months after from the receipt of NTP

The *Inception Report and Work and Financial Plan* shall include, among others, the detailed work program for the scope of the study, as well a detailed schedule for all work, including field work related to applicable tasks. The Inception Report shall contain the initial assessment and appreciation of the Consultant on the available data/information collected relative to the study, including their recommendations and additional requirements. The Inception Report shall also include the fulfilment of the study conditions listed in this TOR as well as approached methodologies and other engineering norms to be utilized in the development of the study.

The *Monthly Progress Reports* shall include updates on the physical and financial accomplishments of each of the activities under the Work and Financial Plan, including the difficulties encountered and measures taken to overcome them.



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The *Interim Report* shall include the accomplishments done during the first 6 months of the project, including problems encountered during the conduct of the study, as well as recommendations in order to satisfy the objectives of the study.

The *Draft Final Report*, which shall be submitted to CLSU for final approval, will in general, consist of the completed F/S. It should contain the discussions on the activities as specified on the Scope of Work of the study. It should also include problems encountered during the conduct of the study, as well as solutions done in solving the encountered problems. Finally, the report should be able to conclude as to whether deploying a small biorefinery in the target locations is warranted or not, including the engineering specifications of the small biorefinery to be deployed.

The Final Report shall be prepared and submitted by the Consultant, subject to the acceptance of CLSU, in a set of ten (10) copies along with the reproducible and/or soft copies of all the documents (in CDs, DVDs and/or other media types and in format acceptable to CLSU) comprising the Final Report. The final report shall be prepared in a manner and format similar to the Draft Final Report including the adjustments made, if any, due to CLSU's comments and/or suggestions to the draft final report.

## 6. EXPERTISE REQUIREMENTS

### 6.1 Key Experts, Consultant Qualifications and Skills

**General:** The assignment is intended for an independent consulting team, to be chosen following Republic Act 9184. The team and the key professionals must demonstrate strong experience in bringing together a network of technical, project management and financial partners into small-scale biorefineries. It shall also have experience in executing and leading activities to develop potential investment opportunities. All experts under this contract must demonstrate: Good written and verbal command in English; have excellent communication, analytical and organizational skills; be proficient in report drafting; and have excellent team working abilities. The selection of team members will be primarily based on the technical capability and qualifications.

#### 6.1.1 Team Leader/Biofuels Production and Utilization Expert

##### **Qualifications and Skills:**

The Team Leader should have at least PhD degree in Agricultural Engineering with minimum ten (10) years of work experience in providing advisory services and specific experience in the biofuels field including in capacity as Team Leader of at least two (2) projects of similar nature.

The Team Leader must be knowledgeable in the conduct of VE/VA or pre-F/S and F/S with option analysis/choice of alternatives with at least two (2) projects of work experience related thereto.

The team leader shall be responsible for the overall management and coordination of day-to-day work of the team, monitoring of the progress of the study as well as support the team of experts during performance of the study in all aspects that are within his/her competence and are subject of this specification. In addition, he/she will devise a strategy to create and maintain close contacts and good working relation with NEDA and CLSU-MMSU

**6.1.2 Technical Experts (Qualification and Skills)****6.1.2.1 Fermentation Biologist/Chemist**

The Fermentation Biologist/Chemist should have at least MSc degree in Biological Sciences or Agricultural Chemistry with significant work experience in the biofuels field minimum of five (5) years with at least one (1) project of similar nature.

The consultant shall be responsible to the identification of areas suitable for deployment of ethanol biorefinery as well as identification of feedstock suitable for ethanol production in specific areas. In addition, he/she will participate in the assessment of the potentials of regions.

**6.1.2.2 Agricultural/Environmental Engineer**

Consultant should have at least MSc degree in Agricultural or Environmental Engineering with significant work experience in the biofuels field and project packaging minimum of five (5) years with at least one (1) project of similar nature.

The consultant shall be responsible for the following: i.) assessment of environmental effect of deployment of village-scale ethanol biorefineries in the rural areas, ii.) identify projects and prepare engineering packages for deployment of ethanol biorefineries, and iii.) assist in formulating and assessment of the potentials of regions

**6.1.2.3 Developmental Economist**

Consultant should have at least MS degree in economics, finance or business administration with a professional career of a minimum of five (5) years of relevant work experience in the agriculture systems.

The consultant shall be responsible for the following: i.) perform economic and financial analysis and modelling, ii.) analyse the technical and financial feasibility of renewable energy related to biofuels, iii.) quantify and assess the likelihood of risks in developing and operating small ethanol biorefineries, and iv.) assess key private sector considerations when investing in small biorefineries.

**6.1.2.4 Legal Law Expert**

Legal Law expert must have a University degree in law with at least five (5) years experience in the field of national law and regulations related to the biofuels industry.

The consultant shall provide legal services relating to biofuels and bioethanol production in small scale including analyses of specific legal requirements in setting up small-scale bioethanol plants.

**6.1.2.5 Development Communications Expert**

Development Communications expert must have at least MS degree in Development Communications and minimum (5) years of work experience on dissemination of reports on technology deployment in rural areas related to agricultural products.

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The consultant shall conduct training needs assessment associated with deployment of new technology in the rural areas

### **6.1.3 Support Staff**

Contractor's team shall include adequate support staff to assist the Key Experts in the performance of the Study. Support staff shall perform the necessary technical, administrative and secretarial duties.

## **7. SOURCE OF FUNDS**

Funds for the conduct of subject F/S will be sourced from NEDA's F/S Fund.

## **8. INSTITUTIONAL SET-UP/RESPONSIBILITIES**

### **8.1. Executing Agency (EA)/NEDA**

- 8.1.1 Shall be the Executing Agency (i.e. representative of the Government in the Contract Agreement with the consultant);
- 8.1.2 Shall, through its NEDA Bids and Awards Committee (NBAC), be responsible for facilitating the bidding and tendering of the consultancy services in compliance with Republic Act 9184 and its Implementing Rules and Regulations (IRR) with the Implementing Agency as end-user;
- 8.1.3 Shall be responsible for the disbursement of the fund for the conduct of the F/S once the contract becomes executed;
- 8.1.4 Shall be responsible for the preparation and submission of financial reports as required by the Department of Budget and Management (DBM) and other reportorial requirements regarding the F/S Fund administration;
- 8.1.5 Shall evaluate, in accordance with CLSU, all request for payments/billings and determine the acceptability/correctness of the same;
- 8.1.6 Shall have the option to detail two (2) counterpart technical personnel to the project for the purpose of on-the-job capacity building/technology transfer; and
- 8.1.7 Shall provide, upon the request of the Consulting Firm, available information/data and also, if available, copies of previous related studies subject to the execution of the Non-Disclosure Agreement, if necessary.

### **8.2. Implementing Agency (IA)/CLSU**

- 8.2.1 Shall be the beneficiary/end-user of the consultancy services;
- 8.2.2 Shall be responsible for the contract implementation and management, including ensuring the quality of outputs. Further, CLSU, in coordination with NEDA, shall be responsible for the monitoring and evaluation of the progress of the study and approval of reports to ensure delivery of outputs as specified in Sections 2,3 and 4 of this TOR;
- 8.2.3 Shall provide assistance in coordination with other agencies related to the study;

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- 8.2.4 Shall warrant, with the assistance from NEDA, that the Consulting Firm shall have free and unimpeded access to all lands and properties required for the effective execution of the services. Likewise, CLSU shall be jointly responsible with NEDA for any damage to such land or any property thereon resulting from such access (unless such damage is caused by the willful default or negligence of the Consulting Firm or its Staff);
- 8.2.5 Shall provide, upon the request of the Consulting Firm, available information/data and also, if available, copies of previous related studies subject to the execution of the Non-Disclosure, if necessary;
- 8.2.6 Shall evaluate and endorse to NEDA the acceptability and correctness of the deliverables for the purposes of fund release/payment to the Consulting Firm; and
- 8.2.7 Shall have the option to detail two (2) counterpart technical personnel to the project for the purpose of on-the-job capacity building/technology transfer.

### **8.3. Consulting Firm**

- 8.3.1 Shall be responsible for the conduct of the study and the timely delivery of results/outputs as indicated under Sections 2, 5 and 6 of this TOR;
- 8.3.2 Shall be responsible for the provision of the necessary office space which shall be within close proximity to NEDA or CLSU, for their project staff as well as the Government's detailed personnel including the necessary office equipment (i.e. computers, printers, office supplies, etc.) for the conduct of the study. All equipment procured or used in the development of the project shall be transferred to the government at the end of the project;
- 8.3.3 Shall shoulder all expense required in the conduct of the study, including travel costs and lodging of detailed Government personnel during field visits, except for their salaries;
- 8.3.4 Shall (a) carry out the services with sound engineering theories and practices to ensure that the final works will provide the most economical and feasible development for the study, (b) accept full responsibility for the consulting services to be performed under this TOR for which the Consulting Firm is liable to CLSU, (c) perform the work in an efficient and diligent manner and shall use its best effort to keep reimbursable costs down to the possible minimum without impairing the quality of the services rendered, and (d) comply with, and strictly observe any laws regarding workmen's health and safety, workmen's welfare, compensation for injuries, minimum wage, hours of labor and other labor laws;
- 8.3.5 Shall (a) keep accurate and systematic records and accounts in respect of the services in such form and detail as is customary and sufficient to establish accurately that the costs and expenditures under this TOR have been duly incurred, and (b) permit the duly authorized representatives of the Government from time to time to inspect its records and accounts as well as to audit the same;
- 8.3.6 Shall not assign nor sub-contract any part of the professional engineering services under this TOR to any person or firm, except with prior written consent of

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NEDA/CLSU. The approval by the Government to the assignments of any part of said services or to the engagement by the Consulting Firm of sub-contractors to perform any part of the same shall not relieve the Consulting Firm of any obligations under this TOR;

- 8.3.7 Shall, during or after the conclusion or termination of the study, limit its role under the project to the provision of the services and hereby disqualifies itself and any other contractor, consulting engineer or manufacturer with which it is associated or affiliated, from the provision of goods and services other than the services herein, except as NEDA/CLSU may otherwise agree;
- 8.3.8 Shall prohibit full-time foreign staff during his assignment under this TOR to engage, directly or indirectly, either in his name, or through the Consulting Firm, in any business or professional activities in the Philippines other than the performance of his duties or assignment under this TOR;
- 8.3.9 Shall not any time communicate to any person or entity any information disclosed to them for the purpose of the services, nor shall the Consulting Firm make public any information as to the recommendations formulated in the course of or as a result of the services, except with the prior consent of NEDA/CLSU;
- 8.3.10 Shall agree that nothing contained herein shall be construed as establishing or creating between the Government and the Consulting Firm, the relationship of employer and employee or principal and agent, it being understood that the position of the Consulting Firm and anyone else performing the services is that of an independent contractor;
- 8.3.11 Shall hold the Government free from any and all liabilities, suits, actions, demands, or damages arising from the death or injuries to persons or properties, or any loss resulting from or caused by said personnel incident to or in connection with the services under this TOR. The Consulting Firm shall agree to indemnify, protect and defend at its own expense the Government and its agents from and against all actions, claims and liabilities arising out of acts done by the Consulting Firm or its staff in the performance of the services including the use or violation of any copyrighted materials, patented invention, article or appliance; and
- 8.3.12 Shall provide on-the-job capacity building/technology transfer to the Government's personnel detailed to the project.

## 9. APPROVED BUDGET FOR THE CONTRACT

The procurement of the consulting services for the F/S updating shall be through negotiated procurement. The ABC for the proposed study is **ELEVEN MILLION SEVEN HUNDRED TWO THOUSAND TWO HUNDRED NINETY-TWO PESOS ONLY (Php 11,702,292.00)**, inclusive of all applicable government taxes and charges, professional fees, and other incidental and administrative costs which shall be paid on a reimbursement basis (e.g., travel expenses, communication expenses, office supplies, office space, and other expenses deemed necessary for the project as certified by the Executing Agency). Attached as **ANNEX B** is the breakdown of the ABC.

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Please note that this consulting contract shall be a fixed price contract. Any extension of contract time shall not involve any additional cost to the Government.

All equipment, materials, item acquired for the study shall be turned over to NEDA at the conclusion of the study.

### 10. PAYMENTS SCHEME/SCHEDULE

- 11.1 The monthly progress reports shall be the basis for payment of reimbursable items. Billing for the reimbursable items may be requested not more than once a month based on the actual expenses incurred and supported by official receipts/documents.

In the absence of *official receipts/documents* when claiming for *reimbursable costs*, the Consulting Firm may also be allowed to submit a *certification of actual disbursements made under oath*.

- 11.2 Billing for non-reimbursable items, including professional fees, shall be in accordance with the following delivery schedule.

Upon acceptance of the Inception Report and Work Plan-15% of total cost for non-reimbursable items	
Upon submission of the Interim Report	-15% of total cost for non-reimbursable items
Upon submission of the Draft Final Report	-40% of total cost for non-reimbursable items
Upon acceptance of the Final Report	-30% of total cost for non-reimbursable items
100%	

- 11.3 The Consulting Firm may also be allowed to submit its own payment schemes for the remuneration component only subject to compliance with existing regulations/laws.
- 11.4 An advance payment shall be made to cover mobilization costs, but shall not exceed FIFTEEN PERCENT (15%) of the contract amount, subject to the posting of an irrevocable standby letter of credit issued by an entity acceptable to NEDA and of an equal amount to the advance payment. The advance payment shall be repaid by the Consulting Firm by deducting from his subsequent billings/payments such sum as agreed upon during contract negotiations until fully liquidated within the duration of the contract.

### 11. RETENTION PAYMENT

A retention payment of ten percent (10%) shall be withheld. It shall be based on the total amount due to the Consulting Firm prior to any deduction and shall be retained from every progress payment until fifty percent (50%) of the value of study, as determined by NEDA, are completed. If, after fifty percent (50%) completion, the study is satisfactorily done and on schedule, no additional retention shall be made; otherwise, the ten percent (10%) retention shall be imposed.

The total "retention money" shall be due for release upon approval of the Final Report. The Consulting Firm may, however, request the substitution of the retention money for each progress billing with irrevocable standby letters of credit from a commercial bank, bank guarantees or surety bonds callable on demand, of amounts equivalent to the retention money substituted for and acceptable to NEDA, provided that the project is on schedule and is satisfactorily undertaken.



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Otherwise, the ten percent (10%) retention shall be made. Said irrevocable standby letters of credit, bank guarantees and/or surety bonds, to be posted in favor of NEDA shall be valid for the duration of the contract.

**12. LIQUIDATED DAMAGES**

Where the Consulting Firm refuses or fails to satisfactorily complete the work within the specified contract time, plus any time extension duly granted and is hereby in default under the contract, the Consulting Firm shall pay NEDA for liquidated damages, and not by way of penalty, an amount, as provided in the conditions of contract, equal to at least one tenth (1 /10) of one (1) percent of the cost of the unperformed portion of the works for every day of delay. Should the amount of liquidated damages reach ten percent (10%) of the contract amount, NEDA shall, at its own discretion, terminate the contract without prejudice to any further action it may take to recover whatever losses incurred due to non-performance of the Consulting Firm.

To be entitled to such liquidated damages, NEDA does not have to prove that it has incurred actual damages. Such amount shall be deducted from any money due or which may become due the Consulting Firm under the contract and/or collect such liquidated damages from the retention money or other securities posted by the Consulting Firm whichever is convenient to NEDA.

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### ANNEX A

The consulting services will be undertaken over a twelve (12)-month period as shown below:

ACTIVITIES / WORKPLAN		MONTHS														
		1	2	3	4	5	6	7	8	9	10	11	12			
Work and Financial Plan, Mobilization, Inception Meetings																
Draft Inception Report																
Inception Report																
Start of Feasibility Study																
Field Visits, Town Hall meetings																
Interim Report																
Draft Final Report for NEDA Comments																
Final Feasibility Study Report																
KEY RESULT AREAS	KEY ACTIVITIES	STRATEGIES	TARGET OUTCOME	MONTHS												KEY PERSONNEL
				1	2	3	4	5	6	7	8	9	10	11	12	
Planning, Preparation and accomplishment of pertinent documents	Inception meetings	Implementation plan of Project Activities	Approved WFP showing concurrence with CLSU and MMSU													Team Leaders Consultants
	Designation and Hiring of Project staff	Recruitment, Orientation and Deployment	Issuance of Special Order to the Project staff CV of Staff													Project Personnel
Feasibility Study Preparation (See also attached details Matrix)	Meeting s with Regional government officials and Private Companies	Courtesy calls and Introduction of the Project	Project coordination with Key officials on the respective areas													Team Leaders Consultants Key Officials
	Identification of target areas	Deployment of Researchers on the areas of concern	Target areas identified													Project personnel and project staff

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KEY RESULT AREAS	KEY ACTIVITIES	STRATEGIES	TARGET OUTCOME	MONTHS												KEY PERSONNEL
				1	2	3	4	5	6	7	8	9	10	11	12	
	Assessment of Target areas on the potential of different feedstock for bioethanol production	Collection of information on the potential of different feedstock for bioethanol production  Field Visits	Different feedstock potential for bioethanol production													Project personnel and Project staff Team Leaders Consultants Field Guides
	Monthly Progress Reporting	Consolidation of data, analysis, and report writing	Monthly Report													Team Leaders Consultants Project personnel and Project staff
	Draft Final Report for NEDA Comments  Final Feasibility Study Report	Preparation of Draft Final Report and submission to NEDA  Reproduction and presentation of Final Feasibility Study Report	Comments of NEDA on the Draft Reports  Manuscript of Feasibility Study													Team Leaders Consultants NEDA Officials

*Note: The above chart is indicative only and does not preclude the shortlisted Consulting Firms from submitting their own work Plan and Gantt Chart of Activities as part of their Technical Proposal.*

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**ANNEX B  
Breakdown of the Approved Budget for the Contract (ABC)**

COST ESTIMATE OF CONSULTING SERVICES					
ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE (Php/unit)	AMOUNT (Php)
<b>1</b>	<b>REMUNERATION OF PERSONNEL</b>				
<b>1.1</b>	<b>Key Personnel</b>				
1.1.1	1 – Project Team Leader/Biofuels Production and Utilization Expert				
1.1.2	1 - Fermentation Biologist 1 - Agricultural/Environmental Engineer				
1.1.3	1 - Developmental Economist				
1.1.4	1 - Legal Law Expert				
1.1.5	1- Developmental Communication Expert				
<b>1.2</b>	<b>Support Staff</b>				
	<b>TOTAL (1. Remuneration of Personnel)</b>				<b>6,515,040.00</b>
<b>2</b>	<b>REIMBURSABLE COSTS</b>				
2.1	Meals and Accommodation				
2.2	Transportation Costs				
	a) Air Fares				
	b) Other Means of Transportation				
2.3	Field/Office Supplies				
	a) Supplies				
	b) Communications				
	c) Office Equipment Rental				
	d) Office Space Rental				
2.4	Printing and Reproduction				
2.5	Field and Survey Works				
2.6	Miscellaneous				
	<b>TOTAL (2. Reimbursable Costs)</b>				<b>5,187,252.00</b>
<b>SUMMARY</b>					
1	Remuneration of Personnel (with 12% VAT)				<b>6,515,040.00</b>
2	Reimbursable Costs (with 5% contingency)				<b>5,187,252.00</b>
<b>TOTAL ESTIMATED COST OF CONSULTING SERVICES</b>					<b>11,702,292.00</b>