Mindoro State University
Victoria, Oriental Mindoro 5205 Philippines
Email: universitypresident@minsu.edu.ph
Website: www.minsu.edu.ph
Mobile: +63 977 846 72 28

BAGONG PILIPINAS

SUPPLY AND DELIVERY OF SENSOR AND CONTROL SYSTEM MATERIALS FOR CONVEYOR AND CARBONIZER FOR BANANA SINGEING PROJECT OF MinSU MAIN CAMPUS
Name of Project

BAC Resolution Recommending Approval
Resolution No. 212, s. 2024

WHEREAS, the **Mindoro State University (MinSU),** through Bids and Awards Committee (BAC) has advertised in the PhilGEPS and MinSU Website the **Request for Quotation (RFQ) No. 2024-194** for the project **"Supply and Delivery of Sensor and Control System Materials for Conveyor and Carbonizer for Banana Singeing Project of MinSU Main Campus"** with an Approved Budget for the Contract (ABC) amounting to **Two Hundred Forty-Three Thousand Pesos (Php243,000.00)**;

WHEREAS, in response to the advertisement of the project, one (1) supplier/bidder was found in the document request list and, only one (1) supplier/bidder in the name of **R & D SOLAR POWER ENGINEERING SERVICES** submitted price quotation before the deadline;

WHEREAS, the detailed evaluation of price quotation resulted in the following:

Approved Budget for the Contract (ABC)	Name of Bidder	Price Quotation
Php243,000.00	R & D Solar Power Engineering Services	Php242,981.00

WHEREAS, the BAC examined and verified the price quotations submitted by the abovementioned supplier and was found to be complying and responsive;

NOW, THEREFORE, BE IT RESOLVED that the BAC hereby recommends to the Head of Procuring Entity the approval of awarding the contract involving the project, **"Supply and Delivery of Sensor and Control System Materials for Conveyor and Carbonizer for Banana Singeing Project of MinSU Main Campus"** as follows:

a. to R & D Solar Power Engineering Services with Single Calculated Responsive Bid (SCRB);

RESOLVED, this 15th day of October, 2024 at MinSU-Main Campus, Alcate, Victoria, Oriental Mindoro,

CIEDELLE P. SALAZAR,*J.D.,Ph.D*
BAC Chairperson

Engr. MARK LESTER A. MAGPANTAY
BAC Vice-Chairperson

ATTY. SHERLYN A. LAYESA
BAC Member

FRANIE M. AFABLE, *DBMHM*
BAC Member

MELGAR G. FADRIQUELAN
BAC Member

[ ] Approved / [ ] Disapproved

ENYA MARIE D. APOSTOL, *Ph.D.*
SUC President III
Date: _____

PhilGEPS Philippine Government Electronic Procurement System — Central Portal for Philippine Government Procurement Oppurtunities

Help

Bid Notice Abstract

Request for Quotation (RFQ)

Reference Number	11339486
Procuring Entity	MINDORO STATE UNIVERSITY
Title	Supply and Delivery of Sensor and Control System Materials for Conveyor and Carbonizer for Banana Singeing Project of MinSU Main Campus
Area of Delivery	Oriental Mindoro

Solicitation Number:	RFQ 2024-194
Trade Agreement:	Implementing Rules and Regulations
Procurement Mode:	Negotiated Procurement - Small Value Procurement (Sec. 53.9)
Classification:	Goods
Category:	Industrial Machinery and Equipment
Approved Budget for the Contract:	PHP 243,000.00
Delivery Period:	30 Day/s
Client Agency:	
Contact Person:	Christian B. Apostol BAC Secretariat Head Alcate Victoria Oriental Mindoro Philippines 5205 63-43-2862368 cbapotol21@gmail.com

Status	**Closed**
Associated Components	1
Bid Supplements	2
Document Request List	1
Date Published	10/10/2024
Last Updated / Time	11/10/2024 15:00 PM
Closing Date / Time	14/10/2024 01:00 AM

Description

Please quote your lowest price on the items / listed below, subject to the General Condition on the last page, stating the shortest time of
delivery and submit your quotation duly signed by your representative not later than _____ in the address stated in the last page.
NEMESIO H. DAVALOS, Ph.D.
BAC Chairperson
Note: 1. All entries must be typewritten.
2. Delivery Period within ___ calendar days.
3. Warranty shall be for a period of six (6) months for supplies and materials, one (1) year for Equipment, from date of acceptance by the procuring entity.
4. Price validity shall be a period of 30 calendar days.
5. G-EPS Registration Certificate shall be attached upon submission of the Quotation.
6. Bidders shall submit Original Brochures showing certification of the product being offered (optional).
7. Mode of delivery: [ ] Pick-up (Schedule) [ ] Door to Door Delivery
Item
No. Unit ITEM AND DESCRIPTION QTY. UNIT
PRICE TOTAL AMOUNT
1 set Programable Logic Controller 1
Slim type, 24V DC, NPN transistor output 16
Inputs/12Outputs
2 RS-232&RS-485 COmmunication interface
set Temperature Expansion 1
24VDC; with series connection to DVP-PLC MPU;
Analog Input: channel 4 channels per modile;
Sensors type: J-type, K-type, R-type, S-type, T□type thermocouple; Communication mode: RS□485)
3 set Programming Cable 1
Communication cable for PLC (DB9 female 8-pin
miniDIN male) 2m legth
connector/terminal block: PC (DB9 female/8 pin
mini DIN male)

Application module: DVP/TP RS-232
4
set
Human Machine Interface (panel type 7" TFT LCD
65535 colors) 1
Resolution 800x480 pixels; Backlight half-life
under room temperature 25C > 20,000 hours;
Brightness 400 cd / m^2 ; COM1 RS-232 / RS□485*2 ; COM2 RS-422 / RS-485*2; software
DOPSOFT)
5
set
Power Supply (Voltage/Supply 85-264VAC,
24VDC) 1
Mounting Type: Chassis Mount, DIN Rail
Output Capacity 1A 24W; OPerating Temp 0C□55C
6 meter Electrical Wire (AWG 12; Insulated Copper Wire) 50
7
set
Miniature Circuit Breaker: 15 or 16 Ampere; 2P;
220~240VAC 5
MSU-BAC-FR-05.01
8
set
Miniature Circuit Breaker: 20 Ampere; 2P;
220~240VAC 1
9
set
230/400 VAC Threee Phase Induction Motor;
250Watts 1
10 set
230/400 VAC Three Phase Induction Motor;
750Watts 1
11 set
1 HP; 230 VAC; 60 hz; single phase Induction
Motor; ~1500rpm 1
12 set
0.5 HP; 230VAC; 60 hz; single phase Induction
Motor; ~1500rpm 1
13 set
230VAC; 60 hz; single phase; vibrator/thumbler
motor; Heavy Duty; atleast 1hp 1
14 set
230 VAC Single Phase VFD; with RS 485 com;
200+Watts 1
15 set
230 VAC Single Phase VFD; with RS 485 com;
750+Watts 1
xvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvx

Created by Annabelle Quinto Madrigal

Date Created 09/10/2024

Mindoro State University
Victoria, Oriental Mindoro 5205 Philippines
Email: universitypresident@minsu.edu.ph
Website: www.minsu.edu.ph
Mobile: +63 977 846 72 28

BAGONG PILIPINAS

REQUEST FOR QUOTATION

Supply and Delivery of Sensor and Control System Materials for Conveyor and Carbonizer for Banana Singeing Project of MinSU Main Campus

~~PR No: PR24-0382~~
RFQ No.: 2024-194
ABC Amount: Php243,000.00

Company Name : R&D Solar Power Power Engineering Services
Address : Zone 7, Pag-asa, Bansud, Oriental Mindoro

Please quote your lowest price on the items / listed below, subject to the General Condition on the last page, stating the shortest time of delivery and submit your quotation duly signed by your representative not later than _____ in the address stated in the last page.

CIEDELLE PIOL-SALAZAR, *J.D., Ph.D.*
BAC Chairperson

Note:
1. **All entries must be typewritten.**
2. **Delivery Period within ____calendar days.**
3. **Warranty shall be for a period of six (6) months for supplies and materials, one (1) year for Equipment, from date of acceptance by the procuring entity.**
4. **Price validity shall be a period of 30 calendar days.**
5. **G-EPS Registration Certificate shall be attached upon submission of the Quotation.**
6. **Bidders shall submit Original Brochures showing certification of the product being offered (optional).**
7. **Mode of delivery: [ ] Pick-up (Schedule) [ ] Door to Door Delivery**

Item No.	Unit	ITEM AND DESCRIPTION	QTY.	UNIT PRICE	TOTAL AMOUNT
1	set	Programable Logic Controller	1	27,216.00	27,216.00
		Slim type, 24V DC, NPN transistor output 16 Inputs/12Outputs			
2		RS-232&RS-485 COmmunication interface		33,807.00	33,807.00
	set	Temperature Expansion	1		
		24VDC; with series connection to DVP-PLC MPU; Analog Input: channel 4 channels per modile;			
		Sensors type: J-type, K-type, R-type, S-type, T-type thermocouple; Communication mode: RS-485)			
3	set	Programming Cable	1	7,920.00	7,920.00
		Communication cable for PLC (DB9 female 8-pin miniDIN male) 2m legth			
		connector/terminal block: PC (DB9 female/8 pin mini DIN male)			
		Application module: DVP/TP RS-232			
4	set	Human Machine Interface (panel type 7" TFT LCD 65535 colors)	1	32,266.00	32,266.00
		Resolution 800x480 pixels; Backlight half-life under room temperature 25C > 20,000 hours;			
		Brightness 400 cd / m^2 ; COM1 RS-232 / RS-485*2 ; COM2 RS-422 / RS-485*2; software DOPSOFT)			
5	set	Power Supply (Voltage/Supply 85-264VAC, 24VDC)	1	6,269.00	6,269.00
		Mounting Type: Chassis Mount, DIN Rail			
		Output Capacity 1A 24W; OPerating Temp 0C-55C			
6	meter	Electrical Wire (AWG 12; Insulated Copper Wire)	50	116.50	5,825.00
7	set	Miniature Circuit Breaker: 15 or 16 Ampere; 2P; 220~240VAC	5	648.40	3,242.00

8	set	Miniature Circuit Breaker: 20 Ampere; 2P; 220~240VAC	1	649.00	649.00
9	set	230/400 VAC Threee Phase Induction Motor; 250Watts	1	16,207.00	16,207.00
10	set	230/400 VAC Three Phase Induction Motor; 750Watts	1	29,821.00	29,821.00
11	set	1 HP; 230 VAC; 60 hz; single phase Induction Motor; ~1500rpm	1	12,966.00	12,966.00
12	set	0.5 HP; 230VAC; 60 hz; single phase Induction Motor; ~1500rpm	1	10,805.00	10,805.00
13	set	230VAC; 60 hz; single phase; vibrator/thumbler motor; Heavy Duty; atleast 1hp	1	17,288.00	17,288.00
14	set	230 VAC Single Phase VFD; with RS 485 com; 200+Watts	1	17,800.00	17,800.00
15	set	230 VAC Single Phase VFD; with RS 485 com; 750+Watts	1	20,900.00	20,900.00
		xvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvx			
			TOTAL		242,981.00

After having carefully read and accepted your General Condition, I / We quote you on the item at prices noted above

ROWELL T. ARGUELLES
Supplier's Signature over Printed Name

452-167-553-00000
TIN No. of Establishment

09079457230
Contact Number

October 14, 2014
Date

MSU-BAC-FR-05.01

Mindoro State University
Victoria, Oriental Mindoro 5205 Philippines
Email: universitypresident@minsu.edu.ph
Website: www.minsu.edu.ph
Mobile: +63 977 846 72 28

BAGONG PILIPINAS

General Conditions

1. Quotations and other requirements stated below shall be submitted to the **Bids and Awards Committee (BAC) Office, Mindoro State University -Main Campus, Alcate, Victoria, Oriental Mindoro**, Philippines on the date and time stated in this RFP.
2. Supplier shall submit the following requirements:
   a. Duly signed original copy of Request for Quotation (RFQ). Prices shall be quoted in Philippine Pesos.
   b. PhilGEPS Registration
   c. Valid Mayor's/Business Permit
   d. Omnibus Sworn Statement
   e. BIR Certificate of Registration
   f. Latest Income/Business Tax Return
   g. TAX Clearance
   h. DTI Registration/SEC Certificate
   i. Original Brochures or certificates of the items offered showing its performance characteristics or specifications, if applicable

Price validity shall be 30 calendar days from the deadline of submission of quotation.

Ocular Inspection

Upon the decision of the End-User and BAC, the supplier and its concerned premises may be subjected to ocular inspection and approval by the End-User and/or TWG inspections of the BAC prior to the award.

Award

The supplier that submitted the lowest calculated responsive quotation, and passed the inspection conducted by the End-User and BAC prior to the event, if any, shall be awarded the contract.

Evaluation of Quotations

Quotations shall be compared and evaluated of the basis of the following criteria:

1. Completeness of Submission
2. Compliance with Item & Description Requirements
3. Price

Instructions

1. Supplier shall be responsible for the source(s) of its goods/services/equipment, and which shall be in accordance with the schedule and specifications of the RFQ or contract. Failure of the supplier to comply with this provision shall be ground for cancellation of the award or purchase order issued to the supplier.
2. Supplier that accepted an award, purchase order, or contract but failed to deliver the required goods/services/equipment within the time called for in the award, purchase order, or contract shall be disqualified from participating in MinSU or any of MinSU campuses future procurement activities. This is without prejudice to the imposition of other sanctions prescribed under R.A. 9184 and its IRR-A against the supplier.
3. All duties, excise, and other taxes and revenue charges shall be paid by the supplier.
4. All transactions are subject to withholding of credible Government Taxes per revenue regulation(s) of the Bureau of Internal Revenue

Liquidation Damages

A penalty of one-tenth of one percent (0.001) of the total value of the undelivered goods/services/equipment shall be charged as liquidated damages for every day of delay of the delivery of the purchased goods/services/equipment.

Warranty

Supplier warrants that all goods/services/equipment to be provided are of acceptable industry standard.

Payment

Payment shall be made only upon a certification by the Head of the Procuring Entity to the effect that the GOODS have been rendered or delivered in accordance with the terms of this Contract and have been duly inspected and accepted.

Republic of the Philippines
Department of Budget and Management
PROCUREMENT SERVICE

CERTIFICATE OF PHILGEPS REGISTRATION
(Platinum Membership)

THIS IS TO CERTIFY THAT

R&D SOLAR POWER ENGINEERING SERVICES

Zone 7, Pag-asa ,
Bansud , Oriental Mindoro , Region IV-B , Philippines

*is registered in the **Philippine Government Electronic Procurement System (PhilGEPS)** on 23-Jan-2023 pursuant to Section 8.5.2 of the Revised Implementing Rules and Regulations of Republic Act No. 9184, otherwise known as the Government Procurement Reform Act.*

*This further certifies that **R&D SOLAR POWER ENGINEERING SERVICES** has submitted the required eligibility documents in the PhilGEPS Supplier Registry as listed in Annex A, which document is attached hereto and made an integral part hereof.*

For the purpose of updating this Certificate, all Class "A" eligibility documents covered by Section 8.5.2 of the Revised Implementing Rules and Regulations of Republic Act No. 9184 supporting the veracity, authenticity and validity of this Certificate shall remain current and updated. The failure by the prospective Bidder to update this Certificate with the current and updated Class "A" eligibility documents shall result in the automatic suspension of its validity until such time that all of the expired Class "A" eligibility documents has been updated.

By submitting this Certificate, the Bidder certifies:

1. *the authenticity, genuineness, validity, and completeness of the copy of the original eligibility documents submitted;*
2. *the veracity of the statements and information contained therein;*
3. *that the Certificate is not a guaranty that the named registrant will be declared eligible without first being determined to be such for that particular bidding, nor is it an evidence that the Bidder has passed the post-qualification stage; and*
4. *that any finding of concealment, falsification, or misrepresentation of any of the eligibility documents submitted, or the contents thereof shall be a ground for disqualification from further participation in the bidding process, without prejudice to the imposition of appropriate administrative, civil and criminal penalty in accordance with the laws.*

This Certificate is valid until 20-May-2025

Issued this 20th day of May 2024.
This is a system generated certificate. No signature is required.

Documentary Stamp Tax Paid Php 30.00
Certificate Reference No: 202301-330829-202423774

REMINDERS [1]

- *The PhilGEPS office shall not determine the eligibility of merchants. The PhilGEPS office's evaluation of the eligibility requirements shall be for the sole purpose of determining the approval or disapproval of the merchant's application for registration.*

- *A merchant's registration and membership in the GOP-OMR is neither contract-specific nor understood to be tantamount to a finding of eligibility. Neither shall the merchant's successful registration in the GOP-OMR be relied upon to claim eligibility for the purpose of participation in any public bidding.*

- *The determination of the eligibility of merchants, whether registered with the GOP-OMR or not, shall remain with the Bids and Awards Committee (BAC). The BAC's determination of validity of the eligibility requirements shall be conclusive to enable the merchant to participate in the public bidding process.*

[1]Refer to Section 4 of the Guidelines for the Use of the Government of the Philippines - Official Merchant's Registry

"Annex A"

List of Eligibility Documents

of

R&D SOLAR POWER ENGINEERING SERVICES

Zone 7, Pag-asa ,
Bansud , Oriental Mindoro , Region IV-B , Philippines

DTI Certificate	DTI Certificate Number : 2973324 Issued By / Signatory : RAMON M LOPEZ Registration Date : 10-Jun-2021 Expiration Date : 10-Jun-2026
Mayors Permit	Expiration Date : 31-Dec-2024 Permit Number : 202417052020000295 Place of Issue : Bansud, Oriental Mindoro Issued By / Signatory : Ronaldo M. Morada Issuance Date : 12-Jan-2024
Tax Clearance	Expiration Date : 05-Mar-2025 TCC Number : RR9A-063-03-05-R0440-2024-E Issued By / Signatory : Rosalinda D. Cabidog Issuance date : 05-Mar-2024
Audited Financial Statement	Date of Filing : 19-Feb-2024 Current Asset : 1,873,418.54 Total Asset : 2,274,078.54 Current Liabilities : 5,708.72 Total Liabilities : 5,708.72 Name of Auditor : Elvin P. Vargas BIR RDO Code : 063
PCAB License	Expiration Date : - Issued By / Signatory : Issuance Date : - License Number : License First Issue Date : - Principal Classification : Category :

Certificate Reference No: 202301-330829-202423774

Republic of the Philippines
Province of Oriental Mindoro
Municipality of Bansud
Office of the Municipal Mayor

Business Permit

To whom it may concern,

Pursuant to the revenue code of this Municipality, after payment of taxes, fees and charges, etc., and compliance with existing requirements, Permit is hereby granted to the herein Taxpayer.

R&D SOLAR POWER ENGINEERING SERVICES

Business Name

PLUMBING, HEAT AND AIR-CONDITIONING INSTALLATION
RETAIL SALE OF ELECTRICAL HOUSEHOLD APPLIANCES, FURNITURE, LIGHTING EQUIPMENT AND OTHER HOUSEHOLD ARTICLES IN SPECIALIZED STORES, N.E.C.

Line of Business

NAUTICAL HIGHWAY PAG-ASA, BANSUD, ORIENTAL MINDORO

Business Address

This PERMIT can be revoked any time if any of the Conditions and Provisions set forth by the Code is violated and/or the peace and order, health, environment, safety and security of the public are at stake.

ROY ILAGAN ARGUELLES	**A-175202-00044**	**2024-1705202000-0295**	
Owner's Name	Business ID No.	Business Permit No.	
452-167-553-000	**Sole Proprietorship**	**2973324**	**Renewal**
Business TIN	Type of Business	DTI Registration No.	Type of Application
Date Issued **2024-01-12**	Valid Until **2024-12-31**	Business Plate No.	No. of Employees **2**

Official Receipt No.	3746591
OR Date	2024-01-12
Payment Mode	Annual

KIND OF FEE	AMOUNT
Occupational Fee	200.00
Garbage Fee	500.00
Mayor's Permit	400.00
Health Certification	50.00
Sticker	50.00
Fire Safety Inspection Fee (Local)	200.00
Sanitary Permit Fee	225.00
Municipal License	11,275.00
ENVIRONMENTAL FEE	100.00
Zoning Inspection	300.00
DST	30.00
Interest	0.00
Surcharge	0.00
Total	**13,330.00**

Ronaldo M. Morada
Local Chief Executive

Remarks

NOTES:

1. Exhibit this Permit in Your Establishment.
2. This Permit is only a privilege and not a right, subject to revocation and closure of Business Establishment for any violation of existing Laws and Ordinances and conditions set forth in the Permit.
3. This Permit must be renewed on or before January 20 of the following year unless sooner revoked for cause. Failure to renew within the time required shall subject the Taxpayer to a surcharge of 25% of the amount of taxes, fees or charges due, plus an interest of 2% per month of the unpaid taxes, fees or charges including surcharges.
4. Your Business Establishment is subject to final inspection or regulatory compliance.
5. Surrender this Permit upon retirement of your Establishment.

Dahil ang Gusto Natin Simple lang, Malinis, Mapayapa at Maunlad na Bayan ng Bansud

BIR FORM
2303
REVISED: APRIL 2019

REPUBLIKA NG PILIPINAS
KAGAWARAN NG PANANALAPI
KAWANIHAN NG RENTAS INTERNAS
REVENUE REGION NO. 09A - CABAMIRO (CAVITE-BATANGAS-MINDORO-ROMBLON)
REVENUE DISTRICT OFFICE NO. 063 - CALAPAN, ORIENTAL MINDORO

OCN: 063RC20240000003904
Date OCN Generated: July 23, 2024

UPDATED ON JUL 23 2024

CERTIFICATE OF REGISTRATION

TIN & BRANCH CODE	**NAME OF TAXPAYER**		**TIN ISSUANCE DATE**
452-167-553-00000	ARGUELLES, ROY ILAGAN		May 21, 2014
REGISTERING OFFICE	X Head Office		Branch
REGISTERED ADDRESS	PAG-ASA 5210 BANSUD ORIENTAL MINDORO PHILIPPINES		

TAX TYPES	FORM TYPES	FILING START DATE	FILING FREQUENCY	FILING DUE DATE
INDIVIDUAL INCOME TAX	1701	June 21, 2021	ANNUALLY	On or before April 15 of each year covering income for the preceding taxable year.
INDIVIDUAL INCOME TAX	1701Q	June 21, 2021	QUARTERLY	1st Quarter-on or before MAY 15 2nd Quarter-on or before AUGUST 15 3rd Quarter-on or before November 15
WITHHOLDING TAX - EXPANDED/OTHERS	0619E	April 13, 2023	MONTHLY	On or before the 10th day of the month following the month in which withholding was made.
WITHHOLDING TAX - EXPANDED/OTHERS	1601EQ	April 13, 2023	QUARTERLY	Not later than the last day of the month following the close of the quarter during which withholding was made.
WITHHOLDING TAX - EXPANDED/OTHERS	1604E	January 1, 2024	ANNUALLY	On or before March 1 of the year following the calendar year in which the income payments subject to expanded withholding taxes or exempt from withholding tax were paid or accrued.
WITHHOLDING TAX - COMPENSATION	1601C	April 13, 2023	MONTHLY	On or before the 10th day of the month following the month when the withholding was made except for taxes withheld for December which shall be filed and paid/remitted on or before January 15 of the succeeding year.
WITHHOLDING TAX - COMPENSATION	1604C	January 1, 2024	ANNUALLY	On or before January 31 of the year following the calendar year in which the compensation payment and other income payments were paid or accrued.
VALUE ADDED TAX	2550Q	July 23, 2024	QUARTERLY	Not later than the 25th day following the close of each taxable quarter.
TAXPAYER TYPE/S	SINGLE PROPRIETORSHIP ONLY (RESIDENT CITIZEN)			

CHANGE IN TAX TYPE

BIR FORM
2303
REVISED: APRIL 2019

REPUBLIKA NG PILIPINAS
KAGAWARAN NG PANANALAPI
KAWANIHAN NG RENTAS INTERNAS
REVENUE REGION NO. 09A - CABAMIRO (CAVITE-BATANGAS-MINDORO-ROMBLON)
REVENUE DISTRICT OFFICE NO. 063 - CALAPAN, ORIENTAL MINDORO

OCN: 063RC20240000003904
Date OCN Generated: July 23, 2024
UPDATED ON JUL 23 2024

CERTIFICATE OF REGISTRATION

TIN & BRANCH CODE	**NAME OF TAXPAYER**			**TIN ISSUANCE DATE**
452-167-553-00000	ARGUELLES, ROY ILAGAN			May 21, 2014
REGISTERING OFFICE	x	Head Office		Branch
REGISTERED ADDRESS	PAG-ASA 5210 BANSUD ORIENTAL MINDORO PHILIPPINES			

BUSINESS INFORMATION DETAILS			
		CATEGORY	**REGISTRATION DATE**
TRADE NAME 1	**R&D SOLAR POWER ENGINEERING SERVICES**		June 21, 2021
(PSIC)	43220-PLUMBING, HEAT AND AIR-CONDITIONING INSTALLATION	Primary	
Line of Business	PLUMBING, HEAT AND AIR-CONDITIONING INSTALLATION		
(PSIC)	47599-RETAIL SALE OF ELECTRICAL HOUSEHOLD APPLIANCES, FURNITURE, LIGHTING EQUIPMENT AND OTHER HOUSEHOLD ARTICLES IN SPECIALIZED STORES, N.E.C.	Secondary	
Line of Business	RETAIL SALE OF ELECTRICAL HOUSEHOLD APPLIANCES, FURNITURE, LIGHTING EQUIPMENT AND OTHER HOUSEHOLD ARTICLES IN SPECIALIZED STORES, N.E.C.		

REMINDERS:
1. An annual registration fee shall be paid upon registration and every year thereafter on or before the last day of January, using BIR Form No. 0605.
2. Filing of required tax return/s to conform with the above tax types, whether with or without business operation, to avoid penalties.
3. For new business registrants, application for registration of manual Books of Accounts (B/As) shall be before the deadline for filing of the initial quarterly income tax return or annual income tax return whichever comes earlier, from the date of registration. Registration of new set of manual B/As shall be before its use.
4. Immediately inform the district office in case of transfer/cessation of business and other changes in registration information by filing BIR Form No. 1905.
5. For Self-Employed Individuals (SEI) whose gross sales and/or receipts and other non-operating income does not exceed P3,000,000 and who opted to avail of the 8% Income tax rate, the tax type Percentage Tax (PT) shall not be reflected in the Certificate of Registration (COR). However, at the start of each taxable year, such SEI shall be automatically subjected to graduated income tax rates and required to file quarterly percentage tax return (BIR Form No. 2551Q) and option to replace the COR to reflect "PT", unless qualified and opted to avail of the 8% Income tax rate annually.

CHANGE IN TAX TYPE

BIR FORM
2303
REVISED: APRIL 2019

REPUBLIKA NG PILIPINAS
KAGAWARAN NG PANANALAPI
KAWANIHAN NG RENTAS INTERNAS
REVENUE REGION NO. 09A - CABAMIRO (CAVITE-BATANGAS-MINDORO-ROMBLON)
REVENUE DISTRICT OFFICE NO. 063 - CALAPAN, ORIENTAL MINDORO

OCN: 063RC20240000003904
Date OCN Generated: July 23, 2024
UPDATED ON JUL 23 2024

CERTIFICATE OF REGISTRATION

TIN & BRANCH CODE 452-167-553-00000	**NAME OF TAXPAYER** ARGUELLES, ROY ILAGAN			**TIN ISSUANCE DATE** May 21, 2014
REGISTERING OFFICE	x	Head Office		Branch
REGISTERED ADDRESS PAG-ASA 5210 BANSUD ORIENTAL MINDORO PHILIPPINES				

DOMIS RENTAS INTERNAS DSK2022 13999925 30 DOCUMENTARY 30

I hereby certify that the above named person is registered as indicated above, under the provision of the National Internal Revenue Code, as amended.

Regina P. Reforma
REGINA P. REFORMA
OIC-Asst. Revenue District Office

CHRISTINE M. CARDONA
REVENUE DISTRICT OFFICER
(Signature over Printed Name)

THIS CERTIFICATE MUST BE EXHIBITED CONSPICUOUSLY IN THE PLACE OF BUSINESS.

CHANGE IN TAX TYPE

SECURITY BANK · BTR-BIR DEPOSIT SLIP

This payment is subject to the Terms and Conditions at the back hereof.
Teller's Validation *(This is your official receipt when machine validated).*

ONLINE CLPN 206723 02/19/2024 10:15:36 AM
BILLS PAYMENT
BIR BILLS PESO / TIN : 452167553000
Remarks : ROY ILAGAN ARGUELLES
CASH PHP 5,709.00
Trans. Ref. No. : 0219240490000070
Thank you for banking with us.
Please keep this transaction record.

DATE: _____

THIS PAYMENT IS FOR: (Please use one deposit slip for each type of payment)

Account no.: 1400-100011-001
Account name: BTR - BIR (Bureau of Treasury - BIR)
Taxpayer name: _____
TIN: _____ **Tax type:** _____
Tax period: _____ **Tax form:** _____

Type of Payment	Amount
☐ Cash	
☐ Check	

Name of bank/branch | Check no.

☐ **Debit my account no.:** _____

Amount in words: _____

_____
Accountholder's signature

AUTHORIZED SIGNATURE

☐ **TDM payment**
TDM no.: Date:

TOTAL PAYMENT PHP _____

TAXPAYER COPY
Please refer to the instructions at the back hereof.

Bureau of Internal Revenue
RDO No. 063 – Oriental Mindoro
Authenticated Copy of the Original

Regina P. Reforma
REGINA P. REFORMA
Asst. Revenue District Officer

FEB 19 2024

For BIR Use Only | BCS/ Item:

Republic of the Philippines
Department of Finance
Bureau of Internal Revenue

BIR Form No. **1701**
January 2018 (ENCS)
Page 1

Annual Income Tax Return

Individuals (including MIXED Income Earner), Estates and Trusts

Enter all required information in CAPITAL LETTERS using BLACK ink. Mark all applicable boxes with an "X". Two copies MUST be filed with the BIR and one held by the Tax Filer.

1701 01/18ENCS P1

1 Month: 12 | For the Year (YYYY): 2023 | 2 Amended Return? ○ Yes ◉ No | 3 Short Period Return? ○ Yes ◉ No

PART I - BACKGROUND INFORMATION OF TAXPAYER/FILER

4 Taxpayer Identification Number (TIN): 152 - 157 - 953 - 000 | 5 RDO Code: 063

6 Taxpayer Type: ☑ Single Proprietor ☐ Professional ☐ Estate ☐ Trust ☑ Compensation Earner

7 Alphanumeric Tax Code (ATC):
○ II011 Compensation Income
○ II012 Business Income-Graduated IT Rates
○ II015 Business Income-8% IT Rate
○ II014 Income from Profession-Graduated IT Rates
○ II017 Income from Profession-8% IT Rate
◉ II013 Mixed Income-Graduated IT Rates
○ II016 Mixed Income-8% IT Rate

8 Taxpayer's Name (Last Name, First Name, Middle Name)/ESTATE OF (First Name, Middle Name, Last Name)/TRUST FAO: (First Name, Middle Name, Last Name)
ARGUELLES, ROY ILAGAN

9 Registered Address (Indicate complete address. If the registered address is different from the current address, go to the RDO to update registered address by using BIR Form No. 1905)
BANSUD, ORIENTAL MINDORO

9A ZIP Code: 5210

10 Date of Birth (MM/DD/YYYY): 01/02/1992

11 Email Address: royarguelles.busemail@gmail.com

12 Citizenship: FILIPINO

13 Claiming Foreign Tax Credits? ○ Yes ◉ No

14 Foreign Tax Number, if applicable:

15 Contact Number (Landline/Cellphone No.): 0434419283

16 Civil Status (if applicable): ◉ Single ○ Married ○ Legally Separated ○ Widow/er

17 If married, spouse has income? ○ Yes ○ No

18 Filing Status: ○ Joint Filing ○ Separate Filing

19 Income EXEMPT from Income Tax? ○ Yes ◉ No
[If yes, fill out also consolidation of ALL activities per Tax Regime (Part X)]

20 Income subject to SPECIAL/PREFERENTIAL RATE? ○ Yes ◉ No
[If yes, fill out also consolidation of ALL activities per Tax Regime (Part X)]

21 Tax Rate* (choose one):
◉ Graduated Rates (Choose Method of Deduction in Item 21A)
○ 8% in lieu of Graduated Rates under Sec. 24(A) & Percentage Tax under Sec. 116 of NIRC [available if gross sales/receipts and other non-operating income do not exceed Three million pesos (P3M)]

21A Method of Deduction (choose one):
◉ Itemized Deduction [Sec. 34(A-J), NIRC]
○ Optional Standard Deduction (OSD) [40% of Gross Sales/Receipts/Revenues/Fees [Sec. 34(L), NIRC]]

PART II - TOTAL TAX PAYABLE (Do NOT Enter Centavos; 49 Centavos or Less drop down; 50 or more round up)

Particular	A. Taxpayer/Filer	B. Spouse
22 Tax Due (From Part VI Item 5)	38,307.00	0.00
23 Less: Total Tax Credits/Payments (From Part VII Item 10)	32,598.00	0.00
24 Tax Payable/(Overpayment) (Item 22 Less Item 23)	5,709.00	0.00
25 Less: Portion of Tax Payable Allowed for 2nd Installment to be paid on or before October 15 (50% or less of Item 22)	0.00	0.00
26 Amount of Tax payable/(Overpayment) (Item 24 Less Item 25)	5,709.00	0.00
Add: Penalties 27 Interest	0.00	0.00
28 Surcharge	0.00	0.00
29 Compromise	0.00	0.00
30 Total Penalties (Sum of Items 27 to 29)	0.00	0.00
31 Total Amount Payable/(Overpayment) (Sum of Items 26 and 30)	5,709.00	0.00
32 Aggregate Amount Payable/(Overpayment) (Sum of Items 26 and 30)	5,709.00	

If overpayment, mark one (1) box only. (Once the choice is made, the same is irrevocable)
○ To be refunded ○ To be issued a Tax Credit Certificate (TCC) ○ To be carried over as a tax credit for next year/quarter

I declare under the penalties of perjury that this return, and all its attachments, have been made in good faith, verified by me, and to the best of my knowledge and belief, are true and correct, pursuant to the provisions of the National Internal Revenue Code, as amended, and the regulations issued under authority thereof. Further, I give my consent to the processing of my information as contemplated under the "Data Privacy Act of 2012 (R.A. No. 10173) for legitimate and lawful purposes. (If signed by an Authorized Representative, indicate TIN and attach authorization letter)

ROY I. ARGUELLES
Printed Name and Signature of Taxpayer/Authorized Representative

33 Number of Attachments: 00

PART III - DETAILS OF PAYMENT

Particulars	Drawee Bank/Agency	Number	Date (MM/DD/YYYY)	Amount
34 Cash/Bank Debit Memo				
35 Check				
36 Tax Debit Memo				
37 Others (specify below)				

Machine Validation/Revenue Official Receipt Details (If not filed with an Authorized Agent Bank)

Stamp of Receiving Office/AAB and Date of Receipt (RO's Signature/Bank Teller's Initial)

RDO CODE-06
CALAPAN
RECEIVED
BANK CODE 0271
TELLER'S
INITIAL/BADGE
FEB 19 2024

NOTE: *The BIR Data Privacy Policy is in the BIR website (www.bir.gov.ph)

DST 2022 05374768

Bureau of Internal Revenue
RDO No. 063 – Oriental Mindoro
Authenticated Copy of the Original
REGINA P. REFERRA
Asst. Revenue District Officer
FEB 19 2024

BIR Form No. **1701**
January 2018 (ENCS)
Page 2

Annual Income Tax Return

Individuals (including MIXED Income Earner), Estates and Trusts

1701 01/18ENCS P2

TIN: 452 167 553 000

Taxpayer/Filer's Last Name: ARGUELLES

PART IV - Background Information of Spouse

1 Spouse's Taxpayer Identification Number (TIN) [ ] - [ ] - [ ] - [ ] 2 RDO Code [ ]

3 Filer's Spouse Type ☐ Single Proprietor ☐ Professional ☐ Compensation Earner

4 Alphanumeric Tax Code (ATC)
○ II011 Compensation Income ○ II012 Business Income-Graduated IT Rates ○ II014 Income from Profession-Graduated IT Rates ○ II013 Mixed Income-Graduated IT Rates
○ II015 Business Income-8% IT Rate ○ II017 Income from Profession-8% IT Rate ○ II016 Mixed Income-8% IT Rate

5 Spouse's Name *(Last Name, First Name, Middle Name)* [ ]

6 Contact Number [ ] 7 Citizenship [ ]

8 Claiming Foreign Tax Credits? ○ Yes ○ No 9 Foreign tax number *(if applicable)* [ ]

10 Income EXEMPT from Income Tax? ○ Yes ○ No
[If yes, fill out also consolidation of ALL activities per Tax Regime (Part X)]

11 Income subject to SPECIAL/PREFERENTIAL RATE? ○ Yes ○ No
[If yes, fill out also consolidation of ALL activities per Tax Regime (Part X)]

12 Tax Rate* (choose one)
○ Graduated Rates (Choose Method of Deduction in Item 12A)
○ 8% in lieu of Graduated Rates under Sec. 24(A) & Percentage Tax under Sec. 116 of NIRC
[available if gross sales/receipts and other non-operating income do not exceed Three million pesos (P3M)]

12A Method of Deduction (choose one)
○ Itemized Deduction [Sec. 34(A-J), NIRC]
○ Optional Standard Deduction (OSD) [40% of Gross Sales/Receipts/Revenues/Fees [Sec. 34(L), NIRC]]

PART V - Computation of Tax

Schedule 1 - Gross Compensation Income and tax Withheld *(Attach Additional Sheet/s, if necessary)*

On Items 1 and 2, enter the required information for each of your employer/s and mark (X) wether the information is for the Taxpayer or the Spouse. On Item 3A, enter the Total Gross Compensation and Total tax Withheld for the Taxpayer and on Item 3B, for the Spouse. (DO NOT enter Centavos; 49 Centavos or less drop down; 50 or more round up)

		a. Name of Employer	b. Employer's TIN	c. Compensation Income	d. Tax Withheld
1	◉ Taxpayer	DEPARTMENT OF AGRICULTURE-MIMAROPA	000 845 895 00000	0.00	0.00
	○ Spouse			0.00	0.00
2	○ Taxpayer				
	○ Spouse				
3A	Gross Compensation Income and Total Tax Withheld for TAXPAYER (To Part V Schedule 2 Item 4A and Part VII Item 5A)			567,650.00	25,602.00
3B	Gross Compensation Income and Total Tax Withheld for SPOUSE (To Part V Schedule 2 Item 4B and Part VII Item 5B)			0.00	0.00

Schedule 2 - Taxable Compensation Income (DO NOT enter Centavos; 49 Centavos or less drop down; 50 or more round up)

Particulars	A. Taxpayer/Filer	B. Spouse
4 Gross Compensation Income (From Part V Schedule 1 Item 3Ac/3Bc)	567,650.00	0.00
5 Less: Non-Taxable / Exempt Compensation	189,642.00	0.00
6 Taxable Compensation Income *(Item 4 Less Item 5)*	378,008.00	0.00
7 Tax Due-Compensation Income *(Item 6 x applicable Income Tax Rate)*	19,201.00	0.00

Schedule 3 - Taxable Business Income *(If graduated rates, fill in items 8 to 24; if 8% flat income tax rate, fill in items 25 to 30)*

3.A - For Graduated Income Tax Rates		
8 Sales/revenues/receipts/Fees	990,689.00	0.00
9 Less: Sales Returns, Allowances and Discounts	0.00	0.00
10 Net Sales/Revenues/Receipts/Fees *(Item 8 Less Item 9)*	990,689.00	0.00
11 Less: Cost of Sales/Services *(applicable only if availing Itemized Deductions)*	537,801.00	0.00
12 Gross Income/(Loss) from Operation *(Item 10 less Item 11)*	452,888.00	0.00
Less: Deductions Allowable under Existing Laws		
13 Ordinary Allowable Itemized Deductions (From Part V Schedule 4 Item 18)	351,862.00	0.00
14 Special Allowable Itemized Deductions (From Part V Schedule 5 Item 3 and/or Item 6)	0.00	0.00
15 Allowable for Net Operating Loss Carry Over (NOLCO) (From Part V Schedule 6 Item 8 and/or Item 13)	0.00	0.00
16 Total Allowable Itemized Deductions *(Sum of Items 13 to 15)*	351,862.00	0.00
OR		
17 Optional Standard Deduction (OSD) *(40% of Item 10)*	0.00	0.00
18 Net Income/(Loss) *(If Itemized: Item 12 Less Item 16; If OSD: Item 10 Less Item 17)*	101,026.00	0.00
Add: Other Non-Operating Income *(specify below)*		
19 [ ]	0.00	0.00
20 [ ]	0.00	0.00
21 Amount Received/Share in Income by a Partner from General Professional Partnership (GPP)	0.00	0.00
22 Total Other Non-Operating Income *(Sum of Items 19 to 21)*	0.00	0.00
23 Taxable Income-Business *(Sum of Items 18 and 22)*	101,026.00	0.00
24 Total Taxable Income - Compensation & Business *(Sum of Items 6 and 23)*	479,034.00	0.00
25 Total Tax Due-Compensation and Business Income *(under graduated rates) (Item 24 x applicable income tax rate)* (To Part VI Item 1)	38,307.00	0.00

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January 2018 (ENCS)
Page 3

Annual Income Tax Return

Individuals (including MIXED Income Earner), Estates and Trusts

1701 01/18ENCS P3

TIN	Taxpayer/Filer's Last Name
452 167 553 000	ARGUELLES

3.B - For 8% Flat Income Tax Rate (DO NOT enter Centavos; 49 Centavos or less drop down; 50 or more round up)

Particulars	A. Taxpayer/Filer	B. Spouse
26 Sales/Revenues/Receipts/Fees *(net of sales returns, allowances and discounts)*	0.00	0.00
Add: Other Non-Operating Income *(specify below)*		
27	0.00	0.00
28 Total Income *(Sum of Items 26 and 27)*	0.00	0.00
29 Less: Allowable reduction from gross sales/receipts and other non-operating income of purely self-employed individuals and/or professionals in the amount of P250,000 (not applicable if with compensation income)	0.00	0.00
30 Taxable Income/(Loss) *(Item 28 Less Item 29)*	0.00	0.00
31 Tax Due-Business Income *(Item 30 x 8% Flat Income Tax Rate)*	0.00	0.00
32 Total Tax Due-Compensation & Business Income (under flat rate)(Sum of Items 7 and 31) (To Part VI Item 1)	0.00	0.00

Schedule 4 - Ordinary Allowable Itemized Deductions *(attach additional sheet/s, if necessary)*

1	Amortizations	0.00	0.00
2	Bad Debts	0.00	0.00
3	Charitable and Other Contributions	0.00	0.00
4	Depletion	0.00	0.00
5	Depreciation	50,220.00	0.00
6	Entertainment, Amusement and Recreation	0.00	0.00
7	Fringe Benefits	0.00	0.00
8	Interest	0.00	0.00
9	Losses	0.00	0.00
10	Pension Trusts	0.00	0.00
11	Rental	0.00	0.00
12	Research and Development	0.00	0.00
13	Salaries, Wages and Allowances	65,535.00	0.00
14	SSS, GSIS, Philhealth, HDMF and Other Contributions	0.00	0.00
15	Taxes and Licenses	40,342.00	0.00
16	Transportation and Travel	0.00	0.00
17	Others (Deductions Subject to Withholding Tax and Other Expenses) *[specify below; Add additional sheet(s), if necesary]*		
	a Janitorial and Messengerial Services	0.00	0.00
	b Professional Fees	7,265.00	0.00
	c Security Services	0.00	0.00
	d OTHER EXPENSES	188,500.00	0.00
18	Total Ordinary Allowable Itemized Deductions *(Sum of Items 1 to 17d)* (To part V Schedule 3.A Item 13)	351,862.00	0.00

Schedule 5 - Special Allowable Itemized Deductions *(attach additional sheet/s, if necessary)*

5.A - Taxpayer/Filer	Description	Legal Basis	Amount
1			0.00
2			0.00
3 Total Special Allowable Itemized Deductions-Taxpayer/Filer *(Sum of Items 1 and 2)* (To part V Schedule 3.A Item 14A)			0.00
5.B - Spouse			
4			0.00
5			0.00
6 Total Special Allowable Itemized Deductions-Spouse *(Sum of Items 4 and 5)* (To part V Schedule 3.A Item 14B)			0.00

Schedule 6 - Computation of Net Operating Loss carry Over (NOLCO)

6.A - Computation of NOLCO

Description	A. Taxpayer/Filer	B. Spouse
1 Gross Income	0.00	0.00
2 Less: Ordinary Allowable Itemized Deductions	0.00	0.00
3 Net Operating Loss *(Item 1 Less Item 2)* (To Schedule 6.A.1 Item 7A and/or Schedule 6.A.2 Item 12A)	0.00	0.00

6.A.1 - Taxpayer/Filer's Detailed Computation of Available NOLCO

	Net Operating Loss Year Incurred	A. Amount	B. NOLCO Applied Previous Year/s	C. NOLCO Expired	D. NOLCO Applied Current Year	E. Net Operating Loss (Unapplied) *[(E)=A-(B+C+D)]*
4		0.00	0.00	0.00	0.00	0.00
5		0.00	0.00	0.00	0.00	0.00
6		0.00	0.00	0.00	0.00	0.00
7		0.00	0.00	0.00	0.00	0.00
8 Total NOLCO - taxpayer/Filer *(Sum of Items 4D to 7D)* (To Part V Schedule 3.A Item 15A)					0.00	

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Annual Income Tax Return

Individuals (including MIXED Income Earner), Estates and Trusts

1701 01/18ENCS P4

TIN: 452 167 853 000

Taxpayer/Filer's Last Name: ARGUELLES

(Continuation of Schedule 6)

6.A.2 - Spouse's Detailed Computation of Available NOLCO

Net Operating Loss Year Incurred	A. Amount	B. NOLCO Applied Previous Years	C. NOLCO Expired	D. NOLCO Applied Current Year	E. Net Operating Loss (Unapplied) *[(E)=A-(B+C+D)]*
09	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
11	0.00	0.00	0.00	0.00	0.00
12	0.00	0.00	0.00	0.00	0.00
13 Total NOLCO - Spouse *(Sum of Items 9D to 12D)* (To Part V Schedule 3.A Item 15B)				0.00	

PART VI - Summary of Income Tax Due

1 Regular Rate-Income Tax Due (From Part V, Either Item 25 or Item 32)	38,307.00	0.00
2 Special Rate-Income Tax Due (From Part X Item 17B/17F)	0.00	0.00
3 Less: Share of Other Government Agency, *if remitted directly to the Agency*	0.00	0.00
4 Net Special Rate-Income Tax Due/Share of National Govt. *(Item 2 Less Item 3)*	0.00	0.00
5 Total Income Tax Due *(Sum of Items 1 & 4)* (To Part II Item 22)	38,307.00	0.00

PART VII - Tax Credits/Payments *(attach proof)*

1 Prior Year's Excess Credits	0.00	0.00
2 Tax Payments for the First Three (3) Quarters	4,517.00	0.00
3 Creditable Tax Withheld for the First Three (3) Quarters	2,479.00	0.00
4 Creditable Tax Withheld per BIR Form No. 2307 for the 4th Quarter	0.00	0.00
5 Creditable Tax Withheld per BIR Form No. 2316 (From Part V Schedule 1 Item 3Ad/3Bd)	25,602.00	0.00
6 Tax Paid in Return Previously Filed, if this is an Amended Return	0.00	0.00
7 Foreign Tax Credits, *if applicable*	0.00	0.00
8 Special Tax Credits, *if applicable* (To Part VIII Item 5)	0.00	0.00
9 Other Tax Credits/Payments *(specify)*	0.00	0.00
10 Total Tax Credits/Payments *(Sum of Items 1 to 9)* (To Part II Item 23)	32,598.00	0.00

PART VIII - Tax Relief Availment

VIII.A - Special Rate

1 Regular Income Tax Otherwise Due (Part X Item 16B and/or Item 16F X applicable regular income tax rate)	0.00	0.00
2 Tax Relief on Special Allowable Itemized Deductions (Part X Item7B and/or Item 7F X applicable regular income tax rate)	0.00	0.00
3 Sub-Total - Tax Relief *(Sum of Items 1 and 2)*	0.00	0.00
4 Less: Income Tax Due (From Part X Item 17B and/or Item 17F)	0.00	0.00
5 Tax Relief Availment Before Special Tax Credit *(Item 3 Less Item 4)*	0.00	0.00
6 Add: Special Tax Credit, if any (From Part VII Item 8)	0.00	0.00
7 Total Tax Relief Availment-SPECIAL *(Sum of Items 5 and 6)*	0.00	0.00

VIII.B - Exempt

8 Regular Income Tax Otherwise Due (Part X Item 16A and/or Item 16E X applicable regular income tax rate)	0.00	0.00
9 Tax Relief on Special Allowable Itemized Deductions (Part X Item7A and/or Item 7E X applicable regular income tax rate)	0.00	0.00
10 Total Tax Relief Availment-EXEMPT *(Sum of Items 8 and 9)*	0.00	0.00

PART IX - Reconciliation of Net Income per Books Against Taxable Income *(Attach additional sheet/s, if necessary)*

Particulars	A. Taxpayer/Filer	B. Spouse
1 Net Income/(Loss) per Books	101,026.00	0.00
Add: Non-Deductible Expenses/Taxable Other Income		
2	0.00	0.00
3	0.00	0.00
4	0.00	0.00
5 Total *(Sum of Items 1 to 4)*	101,026.00	0.00
Less: A) Non-Taxable Income and Income Subjected to Final Tax		
6	0.00	0.00
7	0.00	0.00
B) Special/Other Allowable Deductions		
8	0.00	0.00
9	0.00	0.00
10 Total *(Sum of Items 6 to 9)*	0.00	0.00
11 Net Taxable Income/(Loss) *(Item 5 Less Item 10)*	101,026.00	0.00

REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF FINANCE
BUREAU OF INTERNAL REVENUE
REVENUE REGION NO. 9A - CaBaMiRo
CITY OF STO. TOMAS, BATANGAS
QF-TCC-01-01-2023.00

Annex "M"

TCBP NO. RR9A-063-03-05-R0440-2024-E

TAX CLEARANCE CERTIFICATE

(Pursuant to Executive Order No. 398)

ARGUELLES, ROY ILAGAN

(R&D SOLAR POWER ENGINEERING SERVICES)
Name of Taxpayer

PAG-ASA, BANSUD, ORIENTAL MINDORO
Address

452-167-553-000
Taxpayer Identification Number

This is to certify that the above mentioned taxpayer is eligible for issuance of this Tax Clearance Certificate having satisfied all the criteria set forth by the BIR as of the date of this certification pursuant to Revenue Regulations No. 8-2016, as amended.

Tax liabilities recorded after the aforesaid dates or outside the jurisdiction of this Office are not covered by this tax clearance.

Issued this 5th day of March, 2024.

NOTE: THIS CERTIFICATE SHALL BE VALID AND EFFECTIVE FROM DATE OF ISSUE UNTIL **MARCH 05, 2025** ONLY OR UNTIL REVOKED FOR VIOLATION OF THE CRITERIA SPECIFIED UNDER REVENUE REGULATIONS NO. 8-2016, AS AMENDED AND REVENUE MEMORANDUM ORDER NO. 46-2018, WHICHEVER COMES EARLIER. THIS SHALL NOT BE USED ON SALES/TRANSFER OF REAL PROPERTIES.
CERTIFICATION FEE OF P100 WAS PAID ON FEBRUARY 26, 2024 UNDER EFPS PAYMENT TRANSACTION NO. 249837366.
ANY ERASURE MADE ON THIS TCC SHALL RENDER IT NULL AND VOID.

NOT VALID WITHOUT BIR DRY SEAL

ROSALINDA D. CABIDOG
Chief, Collection Division

DOCUMENTARY STAMP TAX
DATE OF PAYMENT: 02/26/2024
PAYMENT CONFIRMATION:
249837230
AMOUNT: P30.00

WARNING: Counterfeiting is punishable by law. For authenticity, please visit BIR website www.bir.gov.ph/index.php/tax-clearance/released-tax-clearance.html. Tax Clearance Certificate (for bidding purposes) not listed/posted herein will be deemed to have originated from an illegal source.

This certifies that

R&D SOLAR POWER ENGINEERING SERVICES

(CITY/MUNICIPALITY)

BANSUD, ORIENTAL MINDORO - REGION IV-B (MIMAROPA)

is a business name registered in this office pursuant to the provisions of Act 3883, as amended by Act 4147 and Republic Act No. 863, and in compliance with the applicable rules and regulations prescribed by the Department of Trade and Industry.
This certificate issued to

ROY ILAGAN ARGUELLES

is valid from 10 June 2021 to 10 June 2026 subject to continuing compliance with the above-mentioned laws and all applicable laws of the Philippines, unless voluntarily cancelled

In testimony whereof, I hereby sign this

Certificate of Business Name Registration

and issue the same on 10 June 2021 in the Philippines.

RAMON M. LOPEZ
Secretary

Business Name No. 2973324

This certificate is not a license to engage in any kind of business and valid only at the scope indicated herein.

JEDD185612491425

Documentary Stamp Tax Paid Php 30.00

Omnibus Sworn Statement (Revised)
[shall be submitted with the Bid]

REPUBLIC OF THE PHILIPPINES)
CITY/MUNICIPALITY OF CALAPAN) S.S.

AFFIDAVIT

I, **Rowell I. Arguelles**, of legal age, Single, Filipino, and residing at **Pag-asa, Bansud, Orietal Mindoro**, after having been duly sworn in accordance with law, do hereby depose and state that:

1. I am the authorized representative of **R&D Solar Power Engineering Services** with office address at **Zone 7, Pag-asa, Bansud, Oriental Mindoro**;

2. As the authorized representative of **R&D Solar Power Engineering Services**, I have full power and authority to do, execute, and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for ***Supply and Delivery of Sensor and Control System Materials for Conveyor and Carbonizer for Banana Singeing Project of MinSU Main Campus*** as shown in the attached duly notarized Special Power of Attorney;

3. **R&D Solar Power Engineering Services** is not "blacklisted" or barred from bidding by the Government of the Philippines or any of its agencies, offices, corporations, or Local Government Units, foreign government/foreign or international financing institutions whose blacklisting rules have been recognized by the Government Procurement Policy Board, **by itself or by relation, membership, association, affiliation, or controlling interest with another blacklisted person or entity as defined and provided for in the Uniform Guidelines on Blacklisting;**

4. Each of the documents submitted in satisfaction of the bidding requirements is an authentic copy of the original, complete, and all statements and information provided therein are true and correct;

5. **R&D Solar Power Engineering Services** is authorizing the Head of the Procuring Entity or its duly authorized representative(s) to verify all the documents submitted;

6. The owner or sole proprietor is not related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

7. **R&D Solar Power Engineering Services** complies with existing labor laws and standards; and

8. **R&D Solar Power Engineering Services** is aware of and has undertaken the responsibilities as a Bidder in compliance with the Philippine Bidding Documents, which includes:

    a. Carefully examining all of the Bidding Documents;
    b. Acknowledging all conditions, local or otherwise, affecting the implementation of the Contract;
    c. Making an estimate of the facilities available and needed for the contract to be bid, if any; and
    d. Inquiring or securing Supplemental/Bid Bulletin(s) issued for the ***Supply and Delivery of Sensor and Control System Materials for Conveyor and***

Carbonizer for Banana Singeing Project of MinSU Main Campus.

9. **R&D Solar Power Engineering Services** did not give or pay directly or indirectly, any commission, amount, fee, or any form of consideration, pecuniary or otherwise, to any person or official, personnel or representative of the government in relation to any procurement project or activity.

10. **In case advance payment was made or given, failure to perform or deliver any of the obligations and undertakings in the contract shall be sufficient grounds to constitute criminal liability for Swindling (Estafa) or the commission of fraud with unfaithfulness or abuse of confidence through misappropriating or converting any payment received by a person or entity under an obligation involving the duty to deliver certain goods or services, to the prejudice of the public and the government of the Philippines pursuant to Article 315 of Act No. 3815 s. 1930, as amended, or the Revised Penal Code.**

IN WITNESS WHEREOF, I have hereunto set my hand this 14th day of October, 2024 at City Calapan, Oriental Mindoro, Philippines.

ROWELL I. ARGUELLES
Authorize Representative

SUBSCRIBED and **SWORN** to before me this ___ day of _____, **2024** in **Calapan, Oriental Mindoro, Philippines** affiant exhibiting to me his Driver's License with No. D25-19-001946/LTO

_____
Notary Public

Doc. No. 71;
Page No. 16;
Book No. 133;
Series of **2024**.

Until _____
PTR No._____
Date No._____
Place _____
TIN _____

ATTY. RAYMOND JOEL L. BALBUENA
Roll of Attorney's No. 61087
IBP Lifetime No. 010769
PTR No. 1218347 - Calapan City
MCLE Compliance No. VII-0005057
Notarial Commission until December 31, 2024

Omnibus Sworn Statement (Revised)
[shall be submitted with the Bid]

REPUBLIC OF THE PHILIPPINES)
CITY/MUNICIPALITY OF CALAPAN) S.S.

AFFIDAVIT

I, **Rowell I. Arguelles**, of legal age, Single, Filipino, and residing at **Pag-asa, Bansud, Orietal Mindoro**, after having been duly sworn in accordance with law, do hereby depose and state that:

1. I am the authorized representative of **R&D Solar Power Engineering Services** with office address at **Zone 7, Pag-asa, Bansud, Oriental Mindoro**;

2. As the authorized representative of **R&D Solar Power Engineering Services**, I have full power and authority to do, execute, and perform any and all acts necessary to participate, submit the bid, and to sign and execute the ensuing contract for ***Supply and Delivery of Sensor and Control System Materials for Conveyor and Carbonizer for Banana Singeing Project of MinSU Main Campus*** as shown in the attached duly notarized Special Power of Attorney;

3. **R&D Solar Power Engineering Services** is not "blacklisted" or barred from bidding by the Government of the Philippines or any of its agencies, offices, corporations, or Local Government Units, foreign government/foreign or international financing institutions whose blacklisting rules have been recognized by the Government Procurement Policy Board, **by itself or by relation, membership, association, affiliation, or controlling interest with another blacklisted person or entity as defined and provided for in the Uniform Guidelines on Blacklisting;**

4. Each of the documents submitted in satisfaction of the bidding requirements is an authentic copy of the original, complete, and all statements and information provided therein are true and correct;

5. **R&D Solar Power Engineering Services** is authorizing the Head of the Procuring Entity or its duly authorized representative(s) to verify all the documents submitted;

6. The owner or sole proprietor is not related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

7. **R&D Solar Power Engineering Services** complies with existing labor laws and standards; and

8. **R&D Solar Power Engineering Services** is aware of and has undertaken the responsibilities as a Bidder in compliance with the Philippine Bidding Documents, which includes:

    a. Carefully examining all of the Bidding Documents;
    b. Acknowledging all conditions, local or otherwise, affecting the implementation of the Contract;
    c. Making an estimate of the facilities available and needed for the contract to be bid, if any; and
    d. Inquiring or securing Supplemental/Bid Bulletin(s) issued for the ***Supply and Delivery of Sensor and Control System Materials for Conveyor and***

Carbonizer for Banana Singeing Project of MinSU Main Campus.

9. **R&D Solar Power Engineering Services** did not give or pay directly or indirectly, any commission, amount, fee, or any form of consideration, pecuniary or otherwise, to any person or official, personnel or representative of the government in relation to any procurement project or activity.

10. **In case advance payment was made or given, failure to perform or deliver any of the obligations and undertakings in the contract shall be sufficient grounds to constitute criminal liability for Swindling (Estafa) or the commission of fraud with unfaithfulness or abuse of confidence through misappropriating or converting any payment received by a person or entity under an obligation involving the duty to deliver certain goods or services, to the prejudice of the public and the government of the Philippines pursuant to Article 315 of Act No. 3815 s. 1930, as amended, or the Revised Penal Code.**

IN WITNESS WHEREOF, I have hereunto set my hand this 14th day of October, 2024 at City Calapan, Oriental Mindoro, Philippines.

ROWELL J. ARGUELLES
Authorize Representative

SUBSCRIBED and **SWORN** to before me this ___ day of _____, **2024** in **Calapan, Oriental Mindoro, Philippines** affiant exhibiting to me his Driver's License with No. D25-19-001946/LTO

_____
Notary Public

Doc. No. 71;
Page No. 16;
Book No. 133;
Series of **2024**.

Until _____
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IBP Lifetime No. 010769
PTR No. 1218347 - Calapan City
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Omnibus Sworn Statement (Revised)
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4. Each of the documents submitted in satisfaction of the bidding requirements is an authentic copy of the original, complete, and all statements and information provided therein are true and correct;

5. **R&D Solar Power Engineering Services** is authorizing the Head of the Procuring Entity or its duly authorized representative(s) to verify all the documents submitted;

6. The owner or sole proprietor is not related to the Head of the Procuring Entity, members of the Bids and Awards Committee (BAC), the Technical Working Group, and the BAC Secretariat, the head of the Project Management Office or the end-user unit, and the project consultants by consanguinity or affinity up to the third civil degree;

7. **R&D Solar Power Engineering Services** complies with existing labor laws and standards; and

8. **R&D Solar Power Engineering Services** is aware of and has undertaken the responsibilities as a Bidder in compliance with the Philippine Bidding Documents, which includes:

    a. Carefully examining all of the Bidding Documents;
    b. Acknowledging all conditions, local or otherwise, affecting the implementation of the Contract;
    c. Making an estimate of the facilities available and needed for the contract to be bid, if any; and
    d. Inquiring or securing Supplemental/Bid Bulletin(s) issued for the ***Supply and Delivery of Sensor and Control System Materials for Conveyor and***

Carbonizer for Banana Singeing Project of MinSU Main Campus.

9. **R&D Solar Power Engineering Services** did not give or pay directly or indirectly, any commission, amount, fee, or any form of consideration, pecuniary or otherwise, to any person or official, personnel or representative of the government in relation to any procurement project or activity.

10. **In case advance payment was made or given, failure to perform or deliver any of the obligations and undertakings in the contract shall be sufficient grounds to constitute criminal liability for Swindling (Estafa) or the commission of fraud with unfaithfulness or abuse of confidence through misappropriating or converting any payment received by a person or entity under an obligation involving the duty to deliver certain goods or services, to the prejudice of the public and the government of the Philippines pursuant to Article 315 of Act No. 3815 s. 1930, as amended, or the Revised Penal Code.**

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Notary Public

Doc. No. 71;
Page No. 16;
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Series of **2024**.

Until _____
PTR No._____
Date No._____
Place _____
TIN _____

ATTY. RAYMOND JOEL L. BALBUENA
Roll of Attorney's No. 61087
IBP Lifetime No. 010769
PTR No. 1218347 - Calapan City
MCLE Compliance No. VII-0005057
Notarial Commission until December 31, 2024

Standard Form Number: SF-GOOD-01
Revised on: May 24, 2004

APPROVED BUDGET FOR THE CONTRACT (ABC)

Supply and Delivery of Sensor and Control System Materials for Conveyor and Carbonizer for Banana Singeing Project of MinSU Main Campus
Alcate, Victoria, Oriental Mindoro
Project Name and Location

Stations: Mindoro State University
Length:

Contract Duration:

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	CURRENT MARKET PRICE	TOTAL COST	VAT, OTHER TAXES AND/OR DUTIES APPLICABLE	FREIGHT & INSURANCE	OTHER INDIRECT COSTS	OTHER COST FACTORS		TOTAL COST	UNIT COST
									INFLATION, CURRRENCY			
									%	VALUE		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11) (5)X(9)	(12) (10%[(5)+(10)]	(13) (11) / (3)
1	Programable Logic Controller	1	set	26,500.00	26,500.00							
	Slim type, 24V DC, NPN transistor output 16 Inputs/12Outputs				-							
2	RS-232&RS-485 COmmunication interface				-							
	Temperature Expansion	1	set	32,950.00	32,950.00							
	24VDC; with series connection to DVP-PLC MPU; Analog Input: channel 4 channels per modile;				-							
	Sensors type: J-type, K-type, R-type, S-type, T-type thermocouple; Communication mode: RS-485)				-							
3	Programming Cable	1	set	7,800.00	7,800.00							
	Communication cable for PLC (DB9 female 8-pin miniDIN male) 2m legth				-							
	connector/terminal block: PC (DB9 female/8 pin mini DIN male)				-							
	Application module: DVP/TP RS-232				-							
4	Human Machine Interface (panel type 7" TFT LCD 65535 colors)	1	set	31,500.00	31,500.00							
	Resolution 800x480 pixels; Backlight half-life under room temperature 25C > 20,000 hours;				-							
	Brightness 400 cd / m^2 ; COM1 RS-232 / RS-485*2 ; COM2 RS-422 / RS-485*2; software DOPSOFT)				-							
5	Power Supply (Voltage/Supply 85-264VAC, 24VDC)	1	set	6,200.00	6,200.00							
	Mounting Type: Chassis Mount, DIN Rail				-							

1845

	Output Capacity 1A 24W; OPerating Temp 0C-55C				-								
6	Electrical Wire (AWG 12; Insulated Copper Wire)	50	meter	116.00	5,800.00								
7	Miniature Circuit Breaker: 15 or 16 Ampere; 2P; 220~240VAC	5	set	640.00	3,200.00								
8	Miniature Circuit Breaker: 20 Ampere; 2P; 220~240VAC	1	set	650.00	650.00								
9	230/400 VAC Threee Phase Induction Motor; 250Watts	1	set	15,800.00	15,800.00								
10	230/400 VAC Three Phase Induction Motor; 750Watts	1	set	29,000.00	29,000.00								
11	1 HP; 230 VAC; 60 hz; single phase Induction Motor; ~1500rpm	1	set	12,800.00	12,800.00								
12	0.5 HP; 230VAC; 60 hz; single phase Induction Motor; ~1500rpm	1	set	10,800.00	10,800.00								
13	230VAC; 60 hz; single phase; vibrator/thumbler motor; Heavy Duty; atleast 1hp	1	set	17,000.00	17,000.00								
14	230 VAC Single Phase VFD; with RS 485 com; 200+Watts	1	set	21,500.00	21,500.00								
15	230 VAC Single Phase VFD; with RS 485 com; 750+Watts	1	set	21,500.00	21,500.00								
	xvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvxvx				-								
	GRAND TOTAL				**243,000.00**								

Prepared by

MARYNEL A. HERMOSA
Member, BAC Secretariat

Submitted by

CHRISTIAN B. APOSTOL, *PhD*
Head, BAC Secretariat

Recommending Approval

CIEDELLE PIOL-SALAZAR, *J.D., Ph.D.*
Chairperson, BAC

Approved

ENYA MARIE D. APOSTOL, *Ph.D.*
SUC President III

1645

MINDORO STATE UNIVERSITY
Main Campus
Alcate, Victoria, Oriental Mindoro

BAGONG PILIPINAS

PURCHASE REQUEST

Fund Cluster:

Office/Section : Accounting		PR No.: PR24-0382 Responsibility Center Code :		Date: September 16, 2024	
Stock/ Property No.	**Unit**	**Item Description**	**Qty**	**Unit Cost**	**Total Cost**
	set	Programable Logic Controller Slim type, 24V DC, NPN transistor output 16 Inputs/12Outputs RS-232&RS-485 COmmunication interface	1	26500.00	26500.00
	set	Temperature Expansion 24VDC; with series connection to DVP-PLC MPU; Analog Input: channel 4 channels per modile; Sensors type: J-type, K-type, R-type, S-type, T-type thermocouple; Communication mode: RS-485)	1	32950.00	32950.00
	set	Programming Cable Communication cable for PLC (DB9 female 8-pin miniDIN male) 2m legth connector/terminal block: PC (DB9 female/8 pin mini DIN male) Application module: DVP/TP RS-232	1	7800.00	7800.00
	set	Human Machine Interface (panel type 7" TFT LCD 65535 colors) Resolution 800x480 pixels; Backlight half-life under room temperature 25C > 20,000 hours; Brightness 400 cd / m^2 ; COM1 RS-232 / RS-485*2 ; COM2 RS-422 / RS-485*2; software DOPSOFT)	1	31500.00	31500.00
	set	Power Supply (Voltage/Supply 85-264VAC, 24VDC) Mounting Type: Chassis Mount, DIN Rail Output Capacity 1A 24W; OPerating Temp 0C-55C	1	6200.00	6200.00
	meter	Electrical Wire (AWG 12; Insulated Copper Wire)	50	116.00	5800.00
	set	Miniature Circuit Breaker: 15 or 16 Ampere; 2P; 220~240VAC	5	640.00	3200.00
	set	Miniature Circuit Breaker: 20 Ampere; 2P; 220~240VAC	1	650.00	650.00
	set	230/400 VAC Threee Phase Induction Motor; 250Watts	1	15800.00	15800.00
	set	230/400 VAC Three Phase Induction Motor; 750Watts	1	29000.00	29000.00
	set	1 HP; 230 VAC; 60 hz; single phase Induction Motor; ~1500rpm	1	12800.00	12800.00
	set	0.5 HP; 230VAC; 60 hz; single phase Induction Motor; ~1500rpm	1	10800.00	10800.00
	set	230VAC; 60 hz; single phase; vibrator/thumbler motor; Heavy Duty; atleast 1hp	1	17000.00	17000.00
	set	230 VAC Single Phase VFD; with RS 485 com; 200+Watts	1	21500.00	21500.00
	set	230 VAC Single Phase VFD; with RS 485 com; 750+Watts	1	21500.00	21500.00
		Total			**243,000.00**

Purpose : Sensor and Control System Materials for Conveyor and Carbonizer TF-1054 07-06-2024-09-294

	Requested by:	Recommending Approval:	Certified: Allotment Available 401-200	Approved by:
Signature :				
Printed Name :	ENGR.MARK KEYLORD S. ONAL	MACARIO B. MASAGCA JR.	ROVELYN P. ROXAS	ENYA MARIE D. APOSTOL, Ph.D.
Designation :	Project Leader	Director for Research and Development	Budget Officer III	SUC PRESIDENT III

DEPARTMENT OF SCIENCE AND TECHNOLOGY
Project Line-Item Budget
CY 2023

Program Title : **ACCELERATED R&D PROGRAM FOR CAPACITY BUILDING OF RESEARCH AND DEVELOPMENT INSTITUTIONS AND INDUSTRIAL COMPETITIVENESS: COLLABORATIVE RESEARCH AND DEVELOPMENT TO LEVERAGE PHILIPPINE ECONOMY (CRADLE) PROGRAM**
Project Title : Development of Automated Banana Leaf Singeing Technology Using Rice Hull Gasifier
Total Duration : One (1) Year and Six (6) Months (1.5 Years)
Current Duration : 01 November 2023 - 31 October 2024 (Year 1 of 1.5 Years)
Implementing Agenc : Mindoro State University (MinSU) - Institute of Agricultural and Biosystems Engineering
Project Leader : Engr. Mark Keylord S. Onal
Cooperating Agency : Merl's Native Delicacies
Monitoring Agency : PCAARRD

	Counterpart Funding		
	MinSU	**Merl's Native Delicacies**	**DOST-GIA**
I. PERSONNEL SERVICES (PS)			
Direct Cost			
Salaries	₱ 274,788.00	₱ 120,000.00	₱ ---
Two (2) Project Technical Specialist I @ ₱47,606.00/mo. x 12 mos.	---	---	1,142,544.00
One (1) Project Technical Assistant I @ ₱27,811.00/mo. x 12 mos.	---	---	333,732.00
One (1) Project Laborer II @ ₱17,614.00/mo. x 12 mos.	---	---	211,368.00
Honoraria			
One (1) Project Leader @ ₱8,800.00/mo. x 12 mos.	---	---	105,600.00
Four (4) Project Staff Level 2 @ ₱6,000.00/mo. x 12 mos.	---	---	288,000.00
Indirect Cost			
PCAARRD			
Honoraria			
One (1) Project Coordinator @ ₱4,400.00/qtr. x 4 qtrs.	---	---	17,600.00
Two (2) Project Support Staff Level 2 @ ₱1,500.00/qtr. x 4 qtrs.	---	---	12,000.00
TOTAL FOR PS	**₱ 274,788.00**	**₱ 120,000.00**	**₱ 2,110,844.00**
II. MAINTENANCE AND OTHER OPERATING EXPENSES (MOOE)			
Direct Cost			
Traveling Expenses (local)	₱ 30,000.00	₱ ---	₱ 170,000.00
Communication Expenses (postage and deliveries, telephone, interne	---	---	20,000.00
Transportation and Delivery Expenses	---	---	20,000.00
Supplies and Materials Expenses			
1. Office Suppliess	---	---	50,000.00
2. Field Supplies	12,000.00	748,853.33	50,000.00
Utilities	140,000.00	---	50,000.00
Representation Expenses	---	---	80,000.00
Professional Services (other professional services - contract labor)	---	---	105,684.00
Other MOOE:			
1. Fabrication of Gasifier	---	---	232,652.00
2. Fabrication of Conveyor System	---	---	90,000.00
3. Paper Registration, Publication, etc.	20,000.00	---	50,000.00
Indirect Cost			
MinSU			
Supplies and Materials Expenses (office supplies)	30,000.00	---	59,000.00
Printing and Binding Expenses	20,000.00	---	50,000.00
Utilities	44,000.00	---	115,968.00
PCAARRD			
Travelling Expenses	---	---	50,000.00
Communication Expenses	---	---	10,000.00
Representation Expenses	---	---	10,000.00
Supplies and Materials Expenses	---	---	45,368.00
TOTAL FOR MOOE	**₱ 296,000.00**	**₱ 748,853.33**	**₱ 1,258,672.00**
III. CAPITAL OUTLAY (CO)			
Direct Cost			
One (1) Sensor and Control System for Conveyor and Gasifier	₱ ---	₱ ---	₱ 243,000.00
One (1) unit Laptop (with license software and accessories)	---	---	100,000.00

DEPARTMENT OF SCIENCE AND TECHNOLOGY
Project Line-Item Budget
CY 2023

Program Title	:	**ACCELERATED R&D PROGRAM FOR CAPACITY BUILDING OF RESEARCH AND DEVELOPMENT INSTITUTIONS AND INDUSTRIAL COMPETITIVENESS: COLLABORATIVE RESEARCH AND DEVELOPMENT TO LEVERAGE PHILIPPINE ECONOMY (CRADLE) PROGRAM**
Project Title	:	Development of Automated Banana Leaf Singeing Technology Using Rice Hull Gasifier
Total Duration	:	One (1) Year and Six (6) Months (1.5 Years)
Current Duration	:	01 November 2023 - 31 October 2024 (Year 1 of 1.5 Years)
Implementing Agency	:	Mindoro State University (MinSU) - Institute of Agricultural and Biosystems Engineering
Project Leader	:	Engr. Mark Keylord S. Onal
Cooperating Agency	:	Merl's Native Delicacies
Monitoring Agency	:	PCAARRD

	Counterpart Funding		
	MinSU	**Merl's Native Delicacies**	**DOST-GIA**
Indirect Cost			
PCAARRD			
One (1) unit Laptop (with license software and accessories)	---	---	80,000.00
TOTAL FOR CO	₱ ---	₱ ---	₱ **423,000.00**
GRAND TOTAL	₱ ***570,788.00***	₱ ***868,853.33***	₱ ***3,792,516.00*** *

* Chargeable against the following:
CY 2023 DOST-GIA A.IIIb.1 (a)

MinSU	**PCAARRD**	**TOTAL**
₱ 3,567,548.00	₱ 224,968.00	₱ **3,792,516.00**

Certified Correct:

ARMELA K. RAZO
Chief, Special Projects Division

Approved for DOST-GIA EXECOM:

LEAH J. BUENDIA
Undersecretary for Research and Development

Date of Approval: 25 September 2023

DOST Form 2 (for Basic/Applied Research)

DETAILED RESEARCH & DEVELOPMENT PROJECT PROPOSAL

(1) PROJECT PROFILE

Program Title:
Accelerated R&D Program for Capacity Building of Research and Development Institutions and Industrial Competitiveness: Collaborative Research and Development to Leverage Philippine Economy (CRADLE) Program

Project Title:
DEVELOPMENT OF AUTOMATED BANANA LEAF SINGEING TECHNOLOGY USING CONTINUOUS-TYPE RICE HULL (CtRH) CARBONIZER

Project Leader/Sex:
ENGR. MARK KEYLORD S. ONAL/MALE

Project Duration (number of months): 18 months
Project Start Date:
Project End Date:

Implementing Agency (Name of University-College-Institute, Department/Organization or Company):

MINDORO STATE UNIVERSITY – INSTITUTE OF AGRICULTURAL & BIOSYSTEMS ENGINEERING
Alcate, Victoria, Oriental Mindoro 5205

Address/Telephone/Fax/Email (Barangay, Municipality, District, Province, Region):

Co-implementing Agency

DOST – Metals Industry Research and Development Center (MIRDC)
General Santos Avenue, Bicutan, Taguig City, 4th District, NCR

DOST – MIMAROPA
General Santos Avenue, Bicutan, Taguig City, 4th District, NCR

(2) COOPERATING AGENCY/IES

Merl's Native Delicacies – Industry partner
Merlita Bolus, 09177074803
Panikian, Naujan, Oriental Mindoro

(3) SITE(S) OF IMPLEMENTATION

IMPLEMENTATION SITES NO.	COUNTRY	REGION	PROVINCE	DISTRICT	MUNICIPALITY	BARANGAY
1.	Philippines	MIMAROPA	Oriental Mindoro	1st	Naujan	Panikian
2.						
3.						
4.						
5.						

(4) TYPE OF RESEARCH
_____ Basic
__X__ Applied

(5) R&D PRIORITY AREA & PROGRAM (based on HNRDA 2017-2022)
_____ Agriculture, Aquatic and Natural Resources

	Commodity: _____ _____ Health Priority Topic: _____ __X__ Industry, Energy and Emerging Technology Sector: _____ _____ Disaster Risk Reduction and Climate Change Adaptation _____ Basic Research Sector: _____
Sustainable Development Goal (SDG) Addressed	1. Good Health and Well Being 2. Affordable and Clean Energy 3. Industry, Innovation and Infrastructure

(6) EXECUTIVE SUMMARY (not to exceed 200 words)

This project aims to develop a banana leaf singeing equipment. This technology will be used by food processor engaged in developing banana leaves as packaging material. This would be implemented by the Prototyping Division in partnership with Merl's Native Delicacies and in collaboration with Mindoro State University. The project duration will be 18 months and would cost ₱ 5.0 M.

Banana Leaf is one of the most common and effective natural Food Contact Materials (FCM) used in the Philippines due to its pliability, hydrophobic, antimicrobial, antiulcerogenic, and antioxidant properties. Banana Leaf is used by Merl's Native Delicacy as its primary materials for their "*Suman sa Lihiya*". But the process of its preparation as packaging material poses safety and health hazards among its workers as they are using traditional method of singeing using charcoal-powered burner. Singeing is the process of slightly scorching, burning or treatment of materials with flame.

This addresses the needs of MSMEs particularly food processors engaged in natural packaging operation to provide safer, reliable, and cost-efficient banana leaf singeing technology for Food Contact Materials (FCM). When adjusted/reconfigured, the technology can also be used by local weavers for singeing natural fibers for them to provide safer and better alternatives for dangerous, costly, and labor-intensive traditional methods. The project will be developed in partnership with the Mindoro State University (MinSU) and Metals Industry Research and Development Center (MIRDC) as the designer, primarily responsible for the design and automation of the technology in cooperation with Merl's Native Delicacy as the primary beneficiary.

(7) INTRODUCTION

Banana leaves are widely used as a food contact material in the Philippine food service industry. The leaf is traditionally used as a liner or wrapper for various food during cooking and packaging. Its functionality in food service and processing industries may be attributed to its availability, fast regeneration, and biodegradability. Also, its inherent chemical components and structure contribute to its suitability as a packaging material, enhancing the sensory properties and shelf life of the food it encloses [1]. The inexhaustible leaves are water and leak proof; free from detergent residues, provide specific flavor and aroma, and act as antioxidants and help in digestion of the food by emanating its ingredients such as vitamin C and potassium during hot food serving [2].

Filipino native delicacies are usually made from glutinous rice (also called sticky rice and locally called *malagkit na bigas*), coconut milk, sugar, cassava, and young coconut meat [2]. These food products are commonly packed using banana leaves and similar materials when

distributed and sold to the market. With the availability of technologies, such as vacuum packaging and water retort, to increase shelf life, the production of these delicacies has increased, the same with the demand for packaging materials like banana leaves.

Tropical countries like the Philippines have diverse vegetation in which various plants and different kinds of leaves can be easily gathered, produced and be used as natural food contact materials (FCM). Leaves commonly found and used as food wrappers in the Philippines are banana leaves, coconut leaves. Leaves packaging is unique, artistic, and add flavor to the product [4]. Banana leaves are commonly used as the packaging material for local delicacies and other food products such as *suman, tupig,* and many others. In practice, mainly in a small production volume, banana leaves are manually heated or singed in an open fire (LPG or charcoal stove) to become pliable and can be formed into the required packaging shape. Singeing is the process of lightly heating or burning the banana leaves. However, when the demand and production are high, a more efficient, faster, cheaper, and safer method of heating the banana leaves is needed.

Presently, the Merl's Native Delicacy employs *"maglalaib"* who are responsible for manual singeing of banana leaves using traditional charcoal-fueled stove. Merl's singe workers experience discomfort by being exposed to the smoke. No specific health problems have been reported but the exposure to smoke could lead to health problems. Since the polycyclic aromatic hydrocarbons are carcinogenic, lung cancer could be a potential health hazard to grill workers.

The current situation of Merl's uses manual singeing of the banana leaves using coconut charcoal. Through the utilization of the much cheaper rice hull, the monthly operating cost will be lessened and the health hazard to the manual singeing workers of the banana leaves will also be eliminated. This method not only poses great risk to workers from burning but also incurs additional cost to the company as coconut charcoal is more expensive and harder to acquire. Merl's Native Delicacies currently use 64 sacks of charcoal a month which cost around ₱37,000. The projected monthly cost of using the rice hull carbonizer is only around ₱21,000.

Rice producers could also benefit by selling their waste rice hull from milling their palay. Banana farmers could also earn by supplying banana leaves to the food processers that will use the technology. Food processors that use banana leaves as food contact materials for delicacies such as *tupig, bibingka, puto* and other food products could benefit from the technology. Restaurants which use singe banana leaf as lining to their plate or as wrapper of rice are also potential users of this technology. Metal fabricators that could fabricate the whole set of technology and integrators that could integrate automation technologies to the rice hull carbonizer and conveyor system will also benefit and will help the sustainability of the technology.

This project offers a value-addition in the production aspect where in there is an improved quality or evenly singed banana leaves, a higher margin of safety for the laborers and a more efficient singeing process resulting to lower production cost. Singeing banana leaves will enhance its natural waxy coating that provides better insulation for hot food. Another positive attribute in using singed banana leaves is the aroma produced when food is wrapped in it. Singeing banana leaves will also make it soft and pliable, making the packaging process more manageable.

(7.1) RATIONALE/SIGNIFICANCE (not to exceed 300 words)

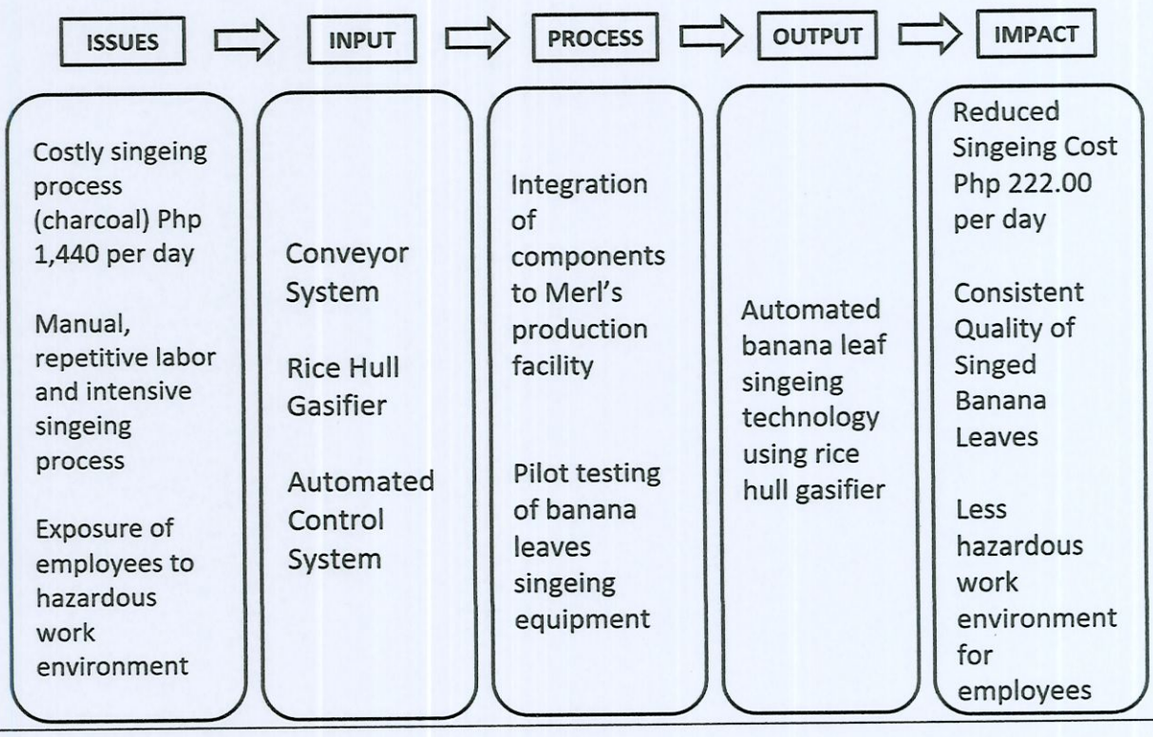
Merl's Native Delicacies is a food processing company located in Calapan, Oriental Mindoro, that ventures into the supply and distribution of pasalubong products. They are known for their best-seller *Suman sa Lihiya,* a native delicacy made of sticky rice. The company produces about 300,000 pieces of *suman* per month and is expanding their market reach abroad.

Currently, the company uses charcoal as the fuel source to singe banana leaves. The workers in charge have separate charcoal stoves that are used to singe the banana leaves by manually. This process is labor-intensive, repetitive, and hazardous to workers' health due to lengthy exposure to charcoal combustion by-products such as dust, particulates, and other harmful fumes and chemicals produced.

The company owner wants to modify their singeing process to be more efficient, faster, and safer for the health of their employees. The solution is to develop an automated banana leaf singeing technology that utilizes rice husk as fuel. A conveyor system will be used to control the contact time of banana leaves with the flame produced in the rice husk carbonizer. This proposed system will reduce the manual and repetitive process of singeing thousands of banana leaves daily and reduce workers' exposure to a hazardous work environment. Also, the cost of rice hull is cheaper, and is abundant in the province, therefore, it will be economical.

Other food processors will use the technology developed in this research, particularly those engaged in the mass production of native delicacies, pasalubong items, and other food products packed in banana leaves. The metal fabricators can acquire a license for the equipment design and manufacture for the companies in need of the equipment. Mindoro State University will also be part of the project, particularly in the testing phase, boosting its R&D capabilities. The banana leaf singeing technology aligns with sustainable development goals 3, 7 and 9, and supports the transition towards circular economy, where resources are used efficiently, and waste is minimized.

(7.2) SCIENTIFIC BASIS/THEORETICAL FRAMEWORK



(7.3) OBJECTIVES

a. General: This project aims to address the needs of MSMEs (Merl's Native Delicacy) to provide safer, reliable, and cost-efficient banana leaf singeing technology for Food Contact Materials (FCM).

b. Specific:

1. To design and install a banana leaves singeing equipment in Merl's Native Delicacies production plant;
2. To come up with an optimum singeing temperature, rice hull feed rate, and exposure time to maximize the use of rice hull as fuel source;
3. To determine the economic viability of the banana leaves singeing technology.

(8) REVIEW OF LITERATURE

Potential Health Risks of Workers Exposed to Charcoal Grilling

The combustion of charcoal reacts with oxygen in the air to form colorless carbon monoxide (among other gases). According to the Food and Agriculture Organization (FAO), unburned carbon monoxide gas can be emitted by burning charcoal which is very poisonous [3]. In a study made by Madani et al., charcoal meat grilling workers exceeded the 5% COHb limit set by the World Health Organization and the National Institute for Occupational Safety Health [4]. COHb is the measurement of carboxyhemoglobin in the blood, which is how exposure to carbon monoxide is estimated.

Aside from carbon monoxide, grill workers are also exposed to the emissions of polycyclic aromatic hydrocarbons (PAHs), which are among the most health-relevant compounds. PAHs are known for being toxic, mutagenic, and have carcinogenic properties [5, 6]. In a study by Oliveira et al., even with a mechanical ventilation system, workers were exposed to PAHs at levels that ranged between 56.2 and 261 ng/m3, with 7.8% of PAHs being carcinogenic compounds [7]. 200 µg/m3 is the occupational threshold limit proposed by the American Conference of Governmental Industrial Hygienists for an 8-hour exposure to coal tar pitch volatiles.

In another study by Dyremark et al., charcoal grilling poses a potential health hazard to the people performing the grilling because of the PAHs emitted [8]. PAHs were also emitted during the combustion of coconut shells, as shown in the study of Gurlutyu [9].

Banana Leaves Preparation

In the study of Luna et al., the most commonly used method of preparation of banana leaves is wiping, washing, and heating or singeing. Convenience and service speed are the primary reasons cited for wiping leaves. However, *suman sa lihiya* production includes the heating process, incurring additional overhead and labor costs [1].

Singeing and oven heating are also implemented by food service establishments in Columbia and Mexico. Heating is done to soften the banana leaves, making them more pliant to facilitate handling when used as a food contact material. According to the respondents in the study of Luna et al., heating is done to kill pathogens that may harm consumers; however, there is no empirical evidence that heating ensures the safety of leaves. For heated banana leaves used as packaging material, food safety and quality breaches are less likely to occur. Heating during cooking may potentially kill spoilage and pathogenic microorganisms. It is also crucial that the

food cooked in banana leaves should be served or packed immediately after proper cooling to reduce microbial recontamination [1].

In the singeing process reported by Luna et al., the banana leaves are passed over the flame for ≤ 20 seconds allowing it to change color from light to dark green without burning. On the other hand, in oven-heating, pre-cut leaves are exposed to hot air for 20-30 seconds. Singeing can potentially generate soot that may contaminate food. Uneven heating of banana leaves occurs due to the manual singeing process. Although these are not observed in oven heating, the oven size is a limitation because it dictates the length of banana leaves to be accommodated. Both heating methods are tedious; thus, designing new mechanical heating equipment suitable for banana leaves could be explored. The prototype design may consider a thermally controlled metal plate device where the leaf can be pressed between plates [1].

Drying and Heating Methods

In the paper of Erbay Z. et al., a pilot-scale heat pump conveyor dryer was used to dry olive leaves. The drying system consisted of two main parts: a heat pump and a drying chamber. The air was heated by a heat pump system, including a scroll compressor, two condensers (internal and external), the expansion valve, an evaporator, and a heat recovery unit. R407C was used as a refrigerant in the heat pump system. The drying air was regulated by a fan and its speed control unit, and the drying air was recycled. Drying compartment dimensions were 3.0 x 1.0 x 1.0 m. Drying experiments were carried out at a drying air temperature range of 45–55 °C with a drying air velocity range of 0.5–1.5 m/s for a time range of 270–390 min. Olive leaves were moved by a conveyor band system driven by a motor. The heat pump was used in drying because of the low operating cost [10].

Akpinar developed a solar dryer with forced convection which was used to investigate the drying of parsley. The setup mainly consists of an indirect, forced convection solar dryer with a solar air collector, a circulating fan, and a drying cabinet. The solar air collector was constructed from stainless steel sheets, and the outer surface was painted black. The solar air heater was covered with a copper sheet. Fins were also installed in the flow area to increase the heat transfer coefficient and output of temperature air. Glass is used to cover the air heater to prevent top heat loss. The drying cabinet was made from wood, forming a rectangular tunnel. Dry and hot air is blown into the top side of the cabinet. A centrifugal fan is installed in the drying cabinet to provide an air velocity of 0.4 m/s. The temperature of drying air at the inlet of the drying cabinet ranged from 50.5 to 64.3 °C and the temperature of drying air at the outlet of the drying cabinet ranged from 43 to 60.4 °C [11].

In the study of Alit et al., a dryer was designed to use two rice husk-fueled furnaces in which heat exchanger pipes are added. The distribution of heat through the heat exchanger pipes and conduction from the furnace attached to the wall of the drying chamber was investigated. The test results show that the average ambient air temperature of 32.14 °C can be increased to 92.10 °C, 93.27 °C, and 94.96 °C in the drying chamber for variations in the diameter of the furnace wall holes of 8 mm, 10 mm, and 12 mm, respectively. Sequentially, the temperature in the drying chamber reaches a maximum of 119.13 °C, 127.98 °C, and 140.89 °C [12].

The dryer system includes a rice husks furnace, stainless steel pipes, iron plates, aluminum plates, solar panels, batteries, exhaust fans, type K thermocouples, and data loggers. Rice husk is the primary energy source in the drying test process. A stainless-steel pipe with a diameter of 1 inch is used as a heat exchanger. Steel plates are considered in the design of the rice husk burning furnace with dimensions of 40 cm × 50 cm x 60 cm. The dimensions of the drying chamber are 50 cm × 50 cm x 140 cm, which is made of an aluminum sheet. A solar panel is used as an energy source to drive the exhaust fan, with batteries as energy storage.

In a separate research article of Alit et al., the heat exchanger is placed at the bottom of the furnace. The furnace and drying chamber are in separate positions. The furnace has dimensions of 800 mm × 500 mm × 500 mm, the stand is 400 mm high and it is made of steel sheet plates. The furnace wall consists of 468 holes. The diameter and the distance between the holes are 1 cm and 5 cm, respectively. Furthermore, the diameter of the furnace ash hole is 12 mm and the heat exchanger pipes are stainless steel pipe.

The drying chamber is made of aluminum with 4 shelves. The insulation is made of rubber with a thickness of 3 mm. The dimensions of the drying chamber are 600 mm × 536 mm x 536 mm, with 400 mm footrest. The hot air is circulating with a forced convection system by means of an exhaust-fan. Exhaust-fan is placed in the chimney of the drying chamber with a constant air velocity of 2 m/s. The study uses measuring devices such as data loggers, K type thermocouples, digital scales, anemometers, and moisture meters [13].

Biomass Fuel for Dryers and Heaters

Bello et al. investigated the thermal properties of three biofuels: charcoal, sawdust, and rice husk. The biomass fuels were burned in a furnace-dryer where the air was supplied through natural convection using air ducts. In order to prevent heat loss, the drying chamber was insulated by a 25.4 mm air space between the inner wall and the outer casing. It was found that charcoal exhibits the highest thermal power (4.08 kW) expressed by temperature increase. The burning of sawdust was slower, and the thermal energy was 3.56 kW. Rice husk has the least thermal power of 2.93 kW due to slight temperature increases and emitting dark exhaust gases. The observed temperature rise and characteristic temperature curves in the drying chamber indicated that charcoal attained a very high drying temperature and increased within a short period than other fuels. The sawdust and rice husk have much lower heat buildup and longer temperature rise response time. Also, charcoal's total energy/heat transfer by conduction per hour is the highest at 1.47 kW per hour, while rice husk is the least with 0.98 kW per hour, though rice husk retains its heat over a long period. It was observed that charcoal completely burns away at shorter durations than sawdust and rice hull [14].

Charcoal is suitable for short time heating processes such as baking and roasting. Rice husk could be ideal for milk and fruit juice pasteurization, which requires heat processing conditions of between 63-85° C for about 15 to 30 minutes. Sawdust can be used to sterilize meat, fish, soup, etc. Charcoal is more environmentally friendly than other products because of the smokeless burning process, thus suitable for indoor cooking [14]. However, rice hull is cheap and lowers drying cost, thus making mechanical drying competitive. As a waste of the rice milling process, the cost of acquiring rice husk is practically its transportation cost to the dryer [15].

Rice Hull Carbonizer

Philippine Rice Research Institute (PhilRice) had developed it's continuous type rice hull carbonizer. It processes rice hull into biochar. It has an input capacity of 20-60 kg/h of rice hull and has a yield of 35 – 42 % charcoal. It's operation is continuous operation, and safe to operate during windy season. Presented in Figure 1 is the PhilRice Continuous Rice hull Carbonizer that the project proposed to utilize.

Figure 1. PhilRice continuous rice hull carbonizer.

PhilRice had developed some attachments for their continuous rice hull carbonizer to utilize the heat it produce. Among the applications were cooking attachment and pasteurization chamber, oven attachment, multi-purpose attachment (roaster), and heat recovery attachment. These attachments are presented in Figure 2.

Figure 2. PhilRice developed attachment to recover heat from the carbonizer.

Carbonization process utilizes higher operating temperatures (>300^{0}C) and longer residence times (>2 hours). Carbonization aims to produce a highly carbonaceous product [16]. The product is called charcoal which refers to the highly carbonaceous product that is intended to be used as a fuel. Furthermore, charcoal can be used in the smelting and sintering processes as a reductant in the metallurgical industry [17]. Carbonization is the oldest known thermochemical process that allowed humans to convert wood into charcoal. Carbonization was performed in the early ages by gathering the wood into a cone-shaped pile, covering it with earth, slowly combusting the wood, and allowing for the water content and volatile substances to exit from a central chimney, turning the wood into coal.

There is a considerable demand for banana leaves in the cooking and packaging of food products, particularly the local delicacies. However, the manual singeing or heating of banana leaves is a tedious process and affects workers' health due to exposure to hot and dusty environments. There is also no existing equipment that can accommodate the heating of a large volume of banana leaves. This study aims to develop a banana leaves heating machine that can process faster and more efficiently but at the same time cheaper using rice hull as fuel.

(9) METHODOLOGY

Existing Practice

Currently, the company produces 14,640 pieces of banana leaves that are ready for suman packaging every day. Eighty-three (83) kilograms of coconut shell charcoal are used to singe the banana leaves to become pliable and suitable for wrapping. Three employees are involved in this process, working 4 hours a day, five days a week.

I. System Design and Development

Proposed System Design

The two main components of the banana leaf singeing technology are the conveyor system and the rice hull carbonizer. The conveyor system will be designed according to the production capacity while the rice hull carbonizer system will be adopted from existing design of PhilRice. The system's capacity will be based on the theoretical calculations of heat energy produced by the carbonizer and the conveyor speed to come up with an optimum exposure time, heating temperature, and rice hull feed rate. Dimensions of the conveyor will be sized according to the required average size of banana leaves, and the speed will be controlled using a variable frequency drive (VFD).

The heating value of the coconut charcoal is 7,200 kcal/kg, while the rice hull is 3,000 kcal/kg. Equations 1 and 2 are used to determine the required energy from the rice hull carbonizer to produce the same capacity or pieces of banana leaves heated by the coconut shell charcoal. In this study, the target production capacity of the proposed heating equipment is 14,640 pcs per day or 50% of the company's total daily capacity. Table 1 shows the summary of the calculation.

$$\dot{Q}_{COAL} = \dot{m}_{COAL} \cdot HHV_{COAL} \cdot \eta_{COAL} \qquad \text{(Eq. 1)}$$

where, $\dot{m}_{COAL}$ is the consumption of the coconut shell coal, HHV_{COAL} is the heating value of the coconut shell coal and η_{COAL} is the thermal efficiency of the system.

$$\dot{m}_{ricehull} = \frac{\dot{Q}}{HHV_{ricehull} \cdot \eta_{ricehull}} \qquad \text{(Eq. 2)}$$

Where, $HHV_{ricehull}$ is the heating value of the rice hull and $\eta_{ricehull}$ is the thermal efficiency of a rice hull carbonizer.

The thermal efficiency of burning coal in the open atmosphere is 10% [24] while typical rice hull carbonizer efficiency ranges from 60-80% [21, 22, 23].

Table 1: Comparison of coconut charcoal and rice hull as fuel for banana leaves heating

Fuel	Heating Value (kcal/kg)	Overall Efficiency (%)	Consumption (kg/day)	Operating Cost (Pesos per month)	Production Rate (pcs/day)
Coconut Shell Charcoal (Stove)	7200	10	41.6	37,200	14,460
Rice Hull (Carbonizer)	3000	60	166.4	15,846	14,460

Assembly and Integration

The fabrication and assembly of the conveyor and the rice hull carbonizer will be done independently. These components will be integrated at the test site. Figure 3 shows the concept design of the proposed banana leaves heating equipment.

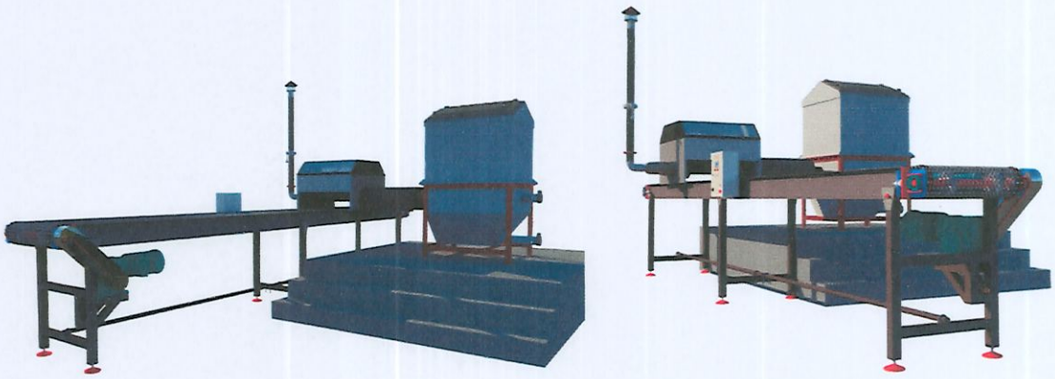


Figure 3 Concept Design Setup

Temperature sensors will be installed in the heating chamber and the carbonizer air inlet. A VFD will also be connected to the motor of the conveyor to adjust the linear speed. Another VFD will be installed in the feeder system of the carbonizer to regulate the feed rate of the rice hull. An extra pipeline will be installed to the burner. This would be used for LPG fuel once there will be a technical problem with the equipment and the operation of the company would not be hampered. These instrumentations will help the researchers determine the system's optimum heating temperature, exposure time, and feed rate to produce the required quality of heated banana leaves.

II. Testing

Functional Testing

These are the criteria that must be satisfied to consider the equipment as fully functional.

Table 2: Functional Test Checklist

Criteria	Yes	No
All motors are functional.		
All blowers are functional.		
The conveyor is functional.		
All VFDs are functional.		
All light indicators are functional.		
All temperature sensors are functional, and the readings are correct.		
Flame is produced from the rice hull carbonizer.		

Testing Protocol

The banana leaves that will be tested in the heating equipment will be prepared according to the company's existing procedure. The rice hull will be weighed before transferring into the hopper.

For a three different constant rice hull feed rate (20.8 kg/h, 5.6 kg/h, 10.4 kg/h), the conveyor will run at different speed settings using the VFD. These feed rates correspond to 100%, 75% and 50% capacity of the rice hull carbonizer. The average length of one piece of banana leaf is 150 mm. The following linear speed will be used (see Table 3).

Table 3: Linear speed with corresponding exposure time and production rate

Conveyor Linear Speed (mm/s)	Leaf Exposure Time (seconds)	Calculated Production Rate (pieces of leaves per day)	Actual Production Rate (pieces of leaves per day)
113.1	1.3	21,714	
94.2	1.6	18,095	
75.4	1.9	14,476	
56.5	2.6	10,857	
37.7	3.9	7,238	

The quality of the singed banana leaves will be inspected, and the optimum linear speed of the conveyor will be determined. If the banana leaves are of below standard quality, the testing will proceed to the next linear speed parameter and exposure time.

For constant linear speed of conveyor, the rice hull feed rate will be varied. The optimum exposure time will be determined and will have a corresponding production rate.

Table 4: Optimum exposure time for different capacity of the rice hull carbonizer.

Carbonizer Capacity (%)	Rice Hull Feed Rate (kg/h)	Optimum Exposure Time (seconds)	Production Rate (pieces per day)
100	20.8		
75	15.6		
50	10.4		

The prototype testing will continue for two months to test the equipment for consistency and reliability. The following parameters shall be taken daily and the average value will be computed:

Table 5: Average rice hull carbonizer capacity for specific production rate

Optimum Carbonizer Capacity	Rice Hull Feed Rate (kg/h)	Optimum Exposure Time (seconds)

These are the performance parameters of the system that will be taken during the testing.

The following data will be noted during the test:

a. System downtime, errors occurred – determine the cause of errors
b. Troubleshooting and repair – determine the parts that are usually repaired
c. User experience (ergonomics, usability)

Banana Leaves Parameters

Aside from the parameters stated above (production rate, optimum carbonizer capacity, rice hull feed rate), banana leaves parameters will also be observed. Several parameters of banana leaves will be benchmarked according to the preference of the company. Color chart will be established based from their existing process. The moisture content of the banana leaves will also be monitored during performance testing. The pliability of the banana leaves will be observed.

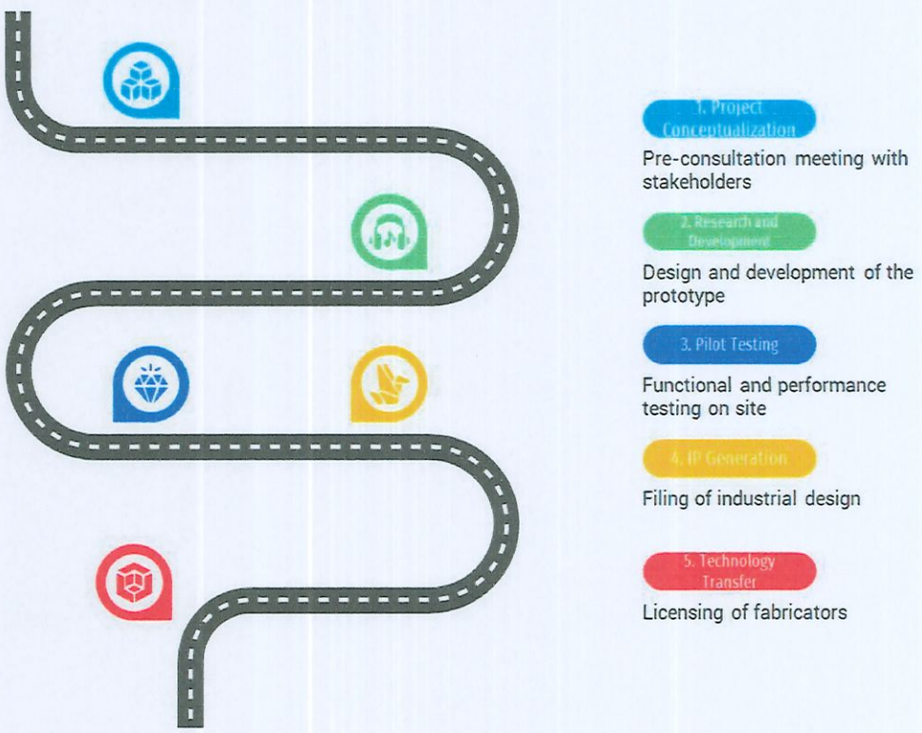
Operation Manual

Manual of operation will be generated after the functional and performance testing of the equipment. The operation manual will be based on the final design of the equipment and will include the drawings of the major parts of the equipment. All the buttons, indicators and controls in the panel will be included. General troubleshooting and repairs will also be included.

III. Economic Viability

The actual rice hull consumption and the number of banana leaves it can singe will be determined during the testing. The actual electric consumption will also be measured. Aside from these parameters, the cost of the rice hull and the worker's wage will dictate the operation's cost. The actual cost of the equipment will be determined. The VFDs and sensors used during the testing will not be included in the cost of the equipment. The monthly savings from using the equipment will determine the return on investment (ROI) from the commercial cost of the equipment.

(10) TECHNOLOGY ROADMAP (if applicable) (use the attached sheet)



(11) EXPECTED OUTPUTS (6Ps)

Publication – At least One (1) scientific paper for conference/publication
- One (1) operation manual
- One (1) audio visual presentation

Patent/Intellectual Property
- One (1) IP applied (rights will be shared by MinSU and DOST-MIRDC)

Product - One (1) unit of automated banana leaf singeing technology

People Services
- Three (3) persons trained for end users,
- One (1) technology training

Partnership - Two (2) partnership with a private company and a local fabricator

Policy - One (1) Draft Method of Test will be endorsed to AMTEC

(12) POTENTIAL OUTCOMES

1. Safe working environment for the workers performing the singeing of banana leaves
2. Productivity of the beneficiary will be increased

(13) POTENTIAL IMPACTS (2Is)

1. Social Impact – Reduction of health hazard for industry workers
2. Economic Impact – New product developed for metal industry; generation of income for beneficiary

(14) TARGET BENEFICIARIES

Merl's Native Delicacies, other businesses using banana leaf as packaging material, and other restaurants using banana leaf as lining in the plates and as wrapper for rice

(15) SUSTAINABILITY PLAN (if applicable)

The output of this project would enable MSME's and farmers to benefit from the developed technology and sustainable practices. The developed system minimizes health impact on the workers and support long-term production by using automation. This system could also benefit MSME's that use heated banana leaves as food contact material such as *tupig, bibingka*, and *puto* or other food products.

Farmers could benefit from the supply of banana leaves. According to the Philippine Statistics Authority, Oriental Mindoro has increased its banana production by 68% in 2021. 3,000 pieces of Pakil leaves per day are used. Pakil leaves are different from the variety of leaves used by other MSME's and is abundant in the area.

MIMAROPA is also 7th largest producer of palay in the Philippines and Oriental Mindoro supplies more than half of the palay produced in the region. Rice producers could also benefit by selling their waste rice hull from milling their palay.

Other MSME's that could benefit the technology is the metal fabricators that could fabricate the whole set of technology. Integrators that could integrate automation technologies to the system will also benefit.

A DOST-assisted local fabricators in the province will be tapped to spearhead the commercialization of the banana leaf singeing technology.

(16) GENDER AND DEVELOPMENT (GAD) SCORE (refer to the attached GAD checklist)

(17) LIMITATIONS OF THE PROJECT

The project will be limited to design, development and testing of the equipment.

(18) LIST OF RISKS AND ASSUMPTIONS RISK MANAGEMENT PLAN (List possible risks and assumptions in attaining target outputs or objectives.)

Risks	Assumptions
Delayed acquisition of necessary equipment	Proceed with other activities such as fabrication of available parts, programming of the programmable logic controller and programming of variable frequency drive.

	Prioritize assembly of available off-the-shelf components, integration and programming Revisit workplan, fast track other activities
Disruption of scheduled activities due to weather disturbances	Make necessary adjustments in the work plan

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(20) PERSONNEL REQUIREMENT

Position	Percent Time Devoted to the Project	Responsibilities
Project Leader (Agricultural and Biosystems Engineer, Renewable Energy)	**20%**	Responsible to the overall technical and administrative management of the project to attain its' objectives Approves all the required documents such as Monitoring Reports, Progress Reports, Performance Evaluation Reports, etc.
Project Staff (Mechanical Engineer)	**20%**	Assist the project leader in overseeing project deliverables Responsible for the conceptualization and design of the equipment and automation system Assist in the programming of the PLC
Project Staff (Background in Economics)	**20%**	Assist the project leader in overseeing project deliverables Assist in the preparation of TORs for bidding Responsible for the implementation of the objective of attaining economic viability of the equipment
Project Staff (Agricultural and Biosystems Engineer, Crop Process Engineering)	**20%**	Assist the project leader in overseeing project deliverables Responsible for the testing and data gathering Assist in the documentation
Project Staff	**20%**	Assist the project leader in overseeing project deliverables Responsible for the preparation of TOR and bidding process Responsible for the monitoring and procurement of necessary fabrication materials
Project Technical Specialist I (CoS), (Automation)	**100%**	Responsible for the integration of the controls, sensors and plc program
Project Technical Specialist I (CoS) (Agricultural and Biosystems Engineer)	**100%**	Responsible for the system design requirements
Project Technical Assistant I (CoS)	**100%**	Liaison and clerical requirements of the project

Project Laborer II (CoS)	**100%**	Responsible for the monitoring of fabrication and assembly of the equipment

(21) BUDGET BY IMPLEMENTING AGENCY

IMPLEMENTING AGENCY	PS	MOOE	EO	Total
Year 1	**2,110,844.00**	**1,258,672.00**	**423,000.00**	**3,792,516.00**
Year 2	**769,786.00**	**437,698.00**	**-**	**1,207,484.00**
Year n				
TOTAL				**5,000,000.00**

(22) OTHER ONGOING PROJECTS BEING HANDLED BY THE PROJECT LEADER: 1 (number)

Title of the Project	Funding Agency	Involvement in the Project
Anthropometric Survey of Farmers in Oriental Mindoro	Mindoro State University	Project Leader

(23) OTHER SUPPORTING DOCUMENTS (Please refer to page 2 for the additional necessary documents.)

I hereby certify the truth of the foregoing and have no pending financial and/or technical obligations from the DOST and its attached Agencies. I further certify that the programs/projects being handled is within the prescribed number as stipulated in the DOST-GIA Guidelines. Any willful omission/false statement shall be a basis of disapproval and cancellation of the project.

	SUBMITTED BY (Project Leader)	ENDORSED BY (Head of the Agency)
Signature		
Printed Name	**ENGR. MARK KEYLORD S. ONAL**	**DR. LEVY B. ARAGO, JR.**
Designation/Title	**INSTRUCTOR/OIC-HEAD OF INSTITUTE OF AGRICULTURAL AND BIOSYSTEMS ENGINEERING**	**MinSU UNIVERISTY PRESIDENT/ CHAIRPERSON RRDCC-MIMAROPA**
Date	**SEPTEMBER 25, 2023**	**SEPTEMBER 25, 2023**

Note: See guidelines/definitions at the back.