ISO 9001:2015 CERTIFIED

CENTRAL LUZON STATE UNIVERSITY

Science City of Muñoz, Nueva Ecija Philippines
Tel. No. (6344) 940-7406; Fax (6344) 456-0107
E-mail Address: oubs@clsu.edu.ph
URL: https://clsu.edu.ph

Manila Office:
No. 7B, Nueva Ecija Street
Bago Bantay, Quezon City
Philippines

Office of the University and Board Secretary

EXCERPTS FROM THE MINUTES OF THE 218th (2019 Q2) REGULAR MEETING OF THE CLSU BOARD OF REGENTS HELD ON 19 JUNE 2019 AT CHED CONFERENCE ROOM, 4/F HEDC BUILDING, C.P. GARCIA AVENUE, U. P. CAMPUS, DILIMAN, QUEZON CITY

After due deliberation and on motion duly seconded, the Board passed -

Resolution No. 36-2019

Approving the proposed **Memorandum of Agreement among the Central Luzon State University, First Gen Energy Solutions, Inc. (FGES) and Pi Energy, Inc.** subject to the integration of the comments/recommendations given by Dr. Julius Caesar V. Sicat, DOST Regional Director and CLSU Board of Regents member, and the granting of authority to **Dr. Tereso A. Abella** as the University President to enter into this MOA. Such MOA is on the installation of a Solar Photovoltaic (PV) System and a Smart Campus Microgrid System with a capability of developing an e-vehicle transport system for the sole account of FGES which shall contract with Pi Energy for such purpose.

Regent Sicat strongly recommended that the following be incorporated in the draft MOA, to wit:

1. transfer of technology to CLSU personnel,
2. non-exclusivity on the use of the buildings where solar panels will be installed, and
3. holding of competitive bidding for retail supply contract at the end of the existing contract with FGES.

APPROVED.

During the 219th Regular Meeting of the CLSU Board of Regents held on 22 August 2019, the Board duly noted the action of the University corollary to Board Res. No. 36-2019, to wit:

1. A meeting with Dr. Sicat was held last 29 July 2019 to finalize the MOA and ascertain that his comments and suggestions were incorporated in the final version.
2. The MOA Signing and Groundbreaking Ceremony for Solar Rooftop Installation was held on 8 August 2019 with Dr. Sicat as one of the witnesses.

I hereby certify to the correctness of the foregoing.

JAYPEE S. DE GUZMAN
University and Board Secretary

EXECUTIVE BRIEF

SUBJECT	Approval of the Memorandum of Agreement with First Gen Energy Solutions, Inc. (FGES) and Pi Energy, Inc. regarding the installation of a Solar Photovoltaic (PV) System and a Smart Campus Microgrid System with a capability of developing an e-vehicle transport system for the sole account of FGES which shall contract with Pi Energy for such purpose.
BACKGROUND	The establishment of linkages and agreements with local, national and international agencies in the academic, research and technical areas is one of the strategies of the University in its proactive engagement and pursuit of quality and excellence in learning.
LEGAL BASIS	▪ Section IV, Paragraph S of RA 8292: To develop consortia and other forms of linkages with local government units, and institutions and agencies, both public and private, local and foreign, in furtherance of the purposes and objectives of the institution.
ENDORSEMENT	Prior approval by the Administrative Council
RECOMMENDATION	For APROVAL by the CLSU Board of Regents
IMPLEMENTATION/ DOCUMENTS	▪ Copy of the proposed memoranda ▪ Presentation materials for the project ▪ Confirmation of the memoranda by the Administrative Council as certified by the University and Board Secretary
CERTIFICATION	I hereby certify to the accurateness and completeness of all the attached documents and full compliance with existing University policies and pertinent government rules and regulations. **TERESO A. ABELLA** University President

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CERTIFICATION

This is to certify that the hereunder agenda item was presented and discussed during the Pre-Board/Technical Working Group Meeting held on 7 June 2019 at the NEDA Region III Office, Regional Government Center, Maimpis, San Fernando City, Pampanga:

Memorandum of Agreement with First Gen Energy Solutions, Inc. and Pi Energy, Inc.

> APPROVAL of the Memorandum of Agreement with First Gen Energy Solutions, Inc. (FGES) and Pi Energy, Inc. regarding the installation of a Solar Photovoltaic (PV) System and a Smart Campus Microgrid System with a capability of developing an e-vehicle transport system for the sole account of FGES which shall contract with Pi Energy for such purpose.

This further certifies that the Technical Working Group favorably endorses this agenda item for appropriate action of the CLSU Board of Regents during its 2019 Second Quarter Meeting to be held in 19 June 2019, 1 PM at the CHED Conference Hall, 4/F HEDC Building, CP Garcia Avenue, UP Campus, Diliman, Quezon City. Such endorsement is subject to full compliance with all existing University policies and relevant government rules and regulations.

HON. JULIUS CAESAR V. SICAT
Member

HON. LEON M. DACANAY, JR.
Member

HON. DANILO S. VARGAS
Member

HON. CRISPULO G. BAUTISTA, JR.
Member

HON. PAULEEN ROSS C. HERNANDEZ
Member

HON. NEMESIO V. TORRES
Member

HON. TERESO A. ABELLA
Vice Chair

Attested:

JAYPEE S. DE GUZMAN
University and Board Secretary

MEMORANDUM OF AGREEMENT

This Memorandum of Agreement (the "Agreement") is made and entered into by and among:

CENTRAL LUZON STATE UNIVERSITY, a state university of the Republic of the Philippines duly organized and existing under and by virtue of Republic Act No. 4067 with principal address at Science City of Munoz, Nueva Ecija, represented herein by its President, **TERESO A. ABELLA,** hereinafter referred to as "**CLSU**";

FIRST GEN ENERGY SOLUTIONS, INC, a corporation duly organized and existing under and by virtue of the laws of the Philippines, with principal address at the 6th Floor, Rockwell Business Center Tower 3, Ortigas Avenue, Pasig City, represented herein by its Vice President, **CARLOS LORENZO L. VEGA,** hereinafter referred to as "**FGES**".

- and –

PI ENERGY INC., a corporation duly organized and existing under and by virtue of the laws of the Philippines, with principal address at the 6th Floor, Rockwell Business Center Tower 3, Ortigas Avenue, Pasig City, represented herein by its Vice President, **DENARDO M. CUAYO,** hereinafter referred to as "**PI ENERGY**".

"**CLSU**", "**FGES**", and the "**PI ENERGY**", are also hereinafter collectively referred to as "Parties" and individually as a "Party".

WITNESSETH THAT:

WHEREAS, CLSU and **FGES** entered into a Retail Supply Agreement dated August 25, 2016 (the "Contract") pursuant to which **FGES** as Supplier agreed to supply electric energy to **CLSU** as Customer in accordance with terms and conditions set forth therein;

WHEREAS, under the Contract, **FGES** is obligated to provide certain Value Added Services to **CLSU** to promote energy efficiency and sustainability;

WHEREAS, one such Value Added Service is the provision of a renewable, clean power source for and within the **CLSU** campus in line with the university's thrust of using technological advancements to promote green energy;

WHEREAS, the Contract further allows **FGES** to supply electricity to **CLSU** from a number of Other Sources including power plants owned and/or operated by **FGES** affiliates;

WHEREAS, PI ENERGY is an affiliate of **FGES** primarily engaged in the generation and supply of energy derived from renewable resources, and the construction and installation of energy-related facilities;

WHEREAS, FGES, as part of its Value Added Service has proposed to **CLSU** and **CLSU** has accepted such proposal, to install a solar photovoltaic system and develop a smart campus microgrid system capable of integrating other energy assets in **CLSU** through the expertise of **PI ENERGY** which shall harness solar energy to produce electricity to be supplied to **CLSU** (the "Project");

NOW THEREFORE, for and in consideration of the foregoing premises and the terms and conditions hereinafter set forth, the Parties have agreed, as they hereby agree, as follows:

1. SCOPE

It is the agreement of the Parties that a Solar Photovoltaic (PV) System and a Smart Campus Microgrid System (collectively the "Facility") with a capability of developing an e-vehicle transport system shall be installed in the **CLSU** campus for the sole account of **FGES**, which shall contract with **PI ENERGY** for such purpose. Electricity produced from the Facility shall be supplied to **CLSU** through **FGES** under the Contract. This Agreement shall govern the relationship of the Parties with respect to this Project, which shall be implemented in three (3) phases as follows:

Phase 1: Installation of Solar PV System

- Rooftop solar installation on the Premises (as defined in Section 2.2)
- Solar PV System integration through the existing distribution transformers
- Installation of smart meters to monitor the solar production of and consumption from the Premises

- Position the Smart Campus Microgrid System as a platform for further energy research and development

Phase 2: Development of a Smart Microgrid System and increasing the capacity of the Solar PV System

- Integration of smart meters, smart controls and the automation platform including provisions for an e-vehicle transport system as a component of the Smart Campus Microgrid System which will utilize excess power generated by the installed Solar PV System, if any.
- Installation of a Solar PV System in other buildings in the CLSU campus and setting up a ground-mounted Solar PV system, if technically and economically feasible upon agreement of the Parties.

Phase 3: Joint Research and Development activities in Agri-Based Renewable Energy

- Integration and incorporation of other generation assets in development (e.g. Biomass generation)

2. OBLIGATIONS OF CLSU

CLSU shall:

2.1. To the extent allowed by its rules and existing contracts, provide all data, records, specifications, plans, drawings and other information that may be required in the design and implementation of the Project;

2.2 Set aside the sites identified as suitable for the Project as enumerated in the list appended hereto as Annex "A" (the "Premises") exclusively for the Project, permit the use and modification thereof, and allow the installation, operation and maintenance of the Facility thereon;

2.3 Allow access to the Premises and the campus to employees, agents, contractors, partners and representatives of **FGES** and **PI ENERGY** for the purpose of implementing the Project, and securing, maintaining and operating the Facility;

2.4 Agree that a portion of its electricity consumption shall be supplied in part by the Facility and in this regard make provisions for the connection between its electrical system and the Facility;

2.5 Appoint a single point of contact ("SPOC") to receive notices, provide support, answer queries, coordinate with other Parties and generally represent **CLSU** in all matters related to the Project at all times;

2.6 Assist the other Parties in securing approvals, permits, clearances, authorizations, certifications and other documents necessary to implement the Project, including, but not limited to, (i) giving its consent for the use by the other Parties of the rooftops and land within the CLSU campus to enable the other Parties to obtain a renewable energy service contract and (ii) as appropriate, obtaining a conversion order to convert agricultural land in the CLSU campus to non-agricultural use to enable the installation of ground-mounted Solar PV as part of the Project.

3. OBLIGATIONS OF FGES

FGES shall:

3.1 At its own exclusive account and with the consent of **CLSU** as evidenced by this Agreement, contract with **PI ENERGY** to implement the Project from design and installation to operation and maintenance;

3.2 Source electricity from the Facility and supply the same to **CLSU** in accordance with the Contract;

3.3 Secure all the necessary approvals, permits, clearances, authorizations, certifications and other consents from **CLSU** necessary to implement the Project;

3.4 Be primarily responsible to **CLSU** for the design and implementation of the Project, and the maintenance and operation of the Facility;

4. OBLIGATIONS OF PI ENERGY

PI ENERGY shall:

4.1 Design, install, operate, maintain and own the Facility;

4.2 Gather data, conduct all studies and technical analysis, identify the suitable installation sites, and draw up design and engineering plans necessary in conceptualizing and finalizing the Project prior to implementation;

4.3 Implement the Project in accordance with the plans and specifications agreed upon with **FGES** in consultation with **CLSU**;

4.4 Secure the relevant Renewable Energy Service Contract ("RESC") from the Department of Energy;

4.5 Secure all other governmental approvals, permits, clearances, authorizations, certifications, insurances, and other consents necessary to implement the Project and commercially operate the Facility;

4.6 Supply electricity to **CLSU** thru **FGES** in accordance with the Contract.

5. TERM AND TERMINATION

This Agreement shall take effect immediately and be coterminous with the Contract between **FGES** and **CLSU** and any extension thereof. The provisions of this Agreement which are specifically stated to survive or whose operation necessarily requires survival after the expiration or termination of this Agreement shall so survive such expiration or termination.

Should the Agreement terminate as provided above but prior to the expiration of the RESC covering the Facility, the rights of the Parties shall be as follows:

i. **PI ENERGY** and **CLSU** shall enter into a contract for the supply of electricity through a Power Supply Agreement or other appropriate document;

ii. The new Retail Energy Supplier that succeeds FGES (the "New RES") will contract with **PI ENERGY** for the supply of energy to **CLSU** through a Power Purchase Agreement or other appropriate document. **CLSU** hereby undertakes to cause the New RES to comply with this provision should the same be adopted; or

iii. The Parties shall negotiate in good faith and enter into any such agreement that may be reached among them regarding the proper disposition of the Facility;

6. CONFIDENTIALITY

Each Party agrees that it will not, at any time or under any circumstances, without the written consent of the other Parties, directly or indirectly communicate or disclose to any person (other than the other Parties or their authorized representatives) the information contained in this Agreement as well as those exchanged between the Parties, any information supplied or made available for examination or otherwise disclosed under this Agreement to any one of the Parties by another Party, except:

(a) such information generally available to the public at the time of disclosure or use;

(b) such information reasonably required to be disclosed by a Party to protect its interests in connection with any legal proceeding under this Agreement, in which case the other Parties will be advised before the information is disclosed; or

(c) such information is required to be disclosed (i) under Philippine law or other law applicable to the disclosing Party; (ii) any governmental authority, and in either case, the other Parties will be advised before the information is disclosed.

7. WARRANTIES AND REPRESENTATIONS

7.1 Each Party warrants and represents that:

7.1.1. Its representative is authorized to sign this Agreement and to bind the entity he or she represents. For this purpose, each representative shall deliver to the others, upon execution of this Agreement, certified true copies of the instruments or certificates of his power of attorney or of his authority.

7.1.2. All approvals necessary to negotiate, conclude and perform this Agreement have been obtained and that this Agreement is a binding covenant upon it.

7.1.3. It has sought and obtained the advice of counsel and other knowledgeable persons on its rights and obligations and the

financial and legal implications of this Agreement, and that it has consented and adhered to this Agreement with full knowledge of such rights, obligations, and implications.

7.1.4. It recognizes that the other Parties consented to this Agreement in reliance on the authority of its signatory and its legal capacity and willingness to contract and perform this Agreement.

8. LIMITATION OF LIABILITY

To the maximum extent permitted by applicable law, in no event shall any Party or any of such Party's affiliates, directors, officers, employees, agents, contractors or subcontractors be liable to any other Party under this Agreement for any incidental, consequential, indirect, special, or punitive damages (including, but not limited to, lost profits) regardless of whether such liability is based on breach of contract, tort (including negligence), strict liability or otherwise and even if advised of the possibility of such damages. Provided, however, that the foregoing limitation of liability shall not apply to a Party's liability in respect of the willful misconduct, gross negligence, fraud, illegality or unlawful acts or omissions of that Party.

9. FURTHER ACTION

Each of the Parties shall use all reasonable efforts to take or cause to be taken all appropriate action, do or cause to be done all things necessary, proper or advisable, and execute and deliver such contracts, agreements, quitclaims, amendments, consents, documents and other papers as may be required to carry out the provisions of this Agreement and make effective the transactions contemplated herein which may include a Usufruct or Lease Agreement, Installation Contract, Connection Agreement, Deed of Assignment, Insurances, Indemnity Agreement, Release, Waiver and Quitclaim, among others.

10. ENTIRE AGREEMENT

This Agreement constitutes the entire agreement and understanding between the Parties with respect to the subject matter hereof and in relation to such subject matter, supersedes any previous agreements or arrangements or representation between the Parties except as otherwise provided herein.

11. SEVERABILITY

11.1 If any provision of this Agreement shall be held by a court or other competent authority to be void, illegal or unenforceable, in whole or in part, under any enactment, rule or principle of law, such provision shall to that extent be deemed not to form a part of this Agreement, but the legality, validity and enforceability of the remaining provisions of this Agreement shall not be affected.

11.2. Upon the determination that any term or other provision of this Agreement is invalid, illegal, or incapable of being enforced, the Parties hereto shall negotiate in good faith to modify this Agreement so as to effect the original intent of the Parties as closely as possible in an acceptable manner in order for the transactions contemplated hereby to be consummated as originally contemplated to the greatest extent possible.

11.3 For the avoidance of doubt, this Agreement shall not encompass all other disputes that have arisen or may arise between the Parties that are wholly unconnected with the subject matter of this Agreement.

12. ASSIGNMENT

The rights and obligations of the Parties under this Agreement may not be assigned by any Party without the prior written consent of the other Parties. This Agreement shall be binding on each of the Parties hereto and all their successors and permitted assignees.

13. NO AMENDMENT

No amendment or variation of this Agreement or any of the documents referred to in it shall be effective unless it is in writing and signed by or on behalf of each of the Parties.

This Agreement may be modified, amended or revised only with the express written consent of all the parties. This Agreement, together with any document referred to in it, constitutes the whole agreement among the Parties relating to its subject matter and supersedes and extinguishes any prior agreements, undertakings, representations, warranties and arrangements of any nature, whether made orally or in writing, relating to such subject matter.

This Agreement, together with any document referred to in it, constitutes the whole agreement among the Parties relating to its subject matter and supersedes and extinguishes any prior agreements, undertakings, representations, warranties and arrangements of any nature, whether made orally or in writing, relating to such subject matter.

14. NO IMPLIED WAIVERS

14.1 No delay on the part of any Party to exercise any right or remedy under this Agreement shall operate as a waiver thereof, or be sufficient to raise an estoppel against such Party or in favor of the other Parties, nor shall any single or partial exercise of any right or remedy preclude any other or further exercise thereof or the exercise of any other right or remedy.

14.2. The rights and remedies provided by this Agreement are cumulative and not exclusive of any other rights and remedies (whether provided herein, by law or otherwise).

15. DISCLAIMER

Nothing in this Agreement shall entitle any person other than the Parties hereto (or their respective successors and permitted assignees) to any claim, cause of action, remedy, or right of any kind, with respect to the subject matter hereof.

16. GOVERNING LAW

This Agreement shall be governed by and construed in accordance with Philippine Law.

17. DISPUTE RESOLUTION

In the event of any dispute, controversy, claim or difference between the Parties arising out of or relating to this Agreement, or a breach thereof, or a dispute in the interpretation of any of the provisions hereof, the authorized representatives of the Parties shall meet and discuss in good faith in an effort to resolve such dispute within thirty (30) days from receipt of written notice from any Party to the other stating the existence of a dispute. If a Party provides written notification to the other Party that such attempt to settle a dispute has failed, then each Party shall promptly appoint a senior representative duly authorized to resolve such

dispute. Each Party shall give notice of the appointment of such senior representative to the other Party and such senior representatives shall try to find a settlement. If such senior representatives have not been appointed or are not able to find any settlement within a period of ten (10) days after the appointment of the senior representative by one Party or such other period as the Parties may agree in writing, then any of the Parties shall give notice to the other Parties of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given.

Any dispute or difference in respect of which a notice of intention to commence arbitration has been given in accordance with this Section shall be settled by arbitration in accordance with the Rules of Arbitration of the Philippine Dispute Resolution Center, Inc. ("PDRCI") in force upon commencement of the arbitration, by three (3) arbitrators appointed in accordance with the said Rules. The seat or place of arbitration shall be in the Republic of the Philippines and the language of arbitration shall be English. The venue of arbitration proceedings shall be in Metro Manila. Any award by the arbitral tribunal shall be final and binding upon the Parties and may be executed by any court of competent jurisdiction for enforcement.

18. COUNTERPARTS

18.1 This Agreement may be signed in any number of counterparts, all of which when taken together shall constitute one and the same instrument.

18.2 Any Party may enter into this Agreement by signing any such counterpart and the execution date shall be the date stated at the beginning of this document.

IN WITNESS WHEREOF, the Parties have hereunto set their hands on this _____ day of _____ 2019 in _____.

CENTRAL LUZON STATE UNIVERSITY

by:

TERESO A. ABELLA

President

FIRST GEN ENERGY SOLUTIONS, INC

by:

CARLOS LORENZO L. VEGA
Vice President

PI ENERGY INC.

by:

DENARDO M. CUAYO
Vice President

SIGNED IN THE PRESENCEO OF

_____ _____

ACKNOWLEDGEMENT

REPUBLIC OF THE PHILIPPINES)
) S.S

BEFORE ME, a Notary Public for and in the above jurisdiction, this _____ 2019, personally appeared:

Name	Proof of Identification	Date and Place Issued
Tereso A. Abella		
Carlos Lorenzo L. Vega		
Denardo M. Cuayo		

known to me and to me known to be the same persons the foregoing instrument and they acknowledged to me that the same is their own free and voluntary act

and deed and the free and voluntary act and deed of the corporations represented herein, and that they are duly authorized to sign the same.

This instrument consisting of _____ pages, including this page whereon the acknowledgement clause is written, signed by the parties and their instrumental witnesses, sealed with my notarial seal, refers to a Memorandum of Agreement.

WITNESS MY HAND AND SEAL on the date and at the place first above-written.

Doc. No.: _____;
Page No.: _____;
Book No.: _____;
Series of 2019.

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Office of the University and Board Secretary

CERTIFICATION

This is to certify that the Administrative Council, during its meeting on 20 March 2019, **APPROVED** the proposed adoption of the Smart Microgrid System offered by FirstGen Energy Solutions, Inc. (Phase I – Installation of solar photovoltaic system, Phase II – E-vehicle system in the campus) subject to strict compliance with all applicable government rules and regulations.

APPROVED.

I hereby certify the correctness of the foregoing.

JAYPEE S. DE GUZMAN
University and Board Secretary

First Gen
Energy Solutions

July 3, 2018

DR. TERESO A. ABELLA
President
CENTRAL LUZON STATE UNIVERSITY
Science of Muñoz, Nueva Ecija

Dear Dr. Abella,

In line with our undertaking in our Retail Supply Contract to provide you with value-added services to promote energy efficiency and sustainability for the CLSU community, we are working with our affiliate, FP Island Energy Corporation (FPIEC), on the feasibility of installing a solar photovoltaic facility and developing a smart solar energy management system within your Munoz, Nueva Ecija campus.

FPIEC is a wholly-owned subsidiary of First Philippine Holdings Corporation and is in the business of providing electric power and energy management services through renewable energy resources such as solar power and advanced controls technologies.

We envision a stand-alone solar project that has the potential to generate electricity for campus use, serve as a research and learning facility for the academe, and put CLSU on the forefront of technological innovation and green energy advancement. FPIEC's letter-proposal describing the initiative is attached here and endorsed for your consideration.

We request your approval to allow us and our colleagues from FPIEC to conduct further studies with you on the financial and technical viability of this project in your campus and to make a formal presentation of the proposed project details at your earliest convenience. All information that may be provided by your team for this study will be treated with strict confidence.

Should you have questions on the foregoing or wish to coordinate with us on any matter, kindly get in touch with the undersigned or our Ma. Elenor "Leny" Limbo at limbo@energy.com.ph.

We look forward to pursuing this project with you.

Sincerely yours,

CARLO VEGA
Vice President
Power Marketing

FP ISLAND ENERGY CORPORATION

6/F Rockwell Business Center Tower 3, Ortigas Avenue, Pasig City 1604, Metro Manila, Philippines

12 July 2018

MR. VICTOR EMMANUEL B. SANTOS, JR.
President
First Gen Energy Solutions, Inc.
6/F Rockwell Business Center Tower 3
Ortigas Avenue, Pasig City

Dear Mr. Santos:

We write in connection with a proposed solar power project (the "Project") for Central Luzon State University (CLSU). We understand that First Gen Energy Solutions, Inc. (FGES) provides electricity supply related services to CLSU including the supply of renewable energy from its grid-connected power plants as well as energy efficiency and other value-added services to help CLSU effectively and efficiently manage its energy consumption and costs. We believe that we can help FGES fulfill this commitment through the proposed Project.

FPIEC is aware that CLSU is one of the premier institutions of agricultural research in Southeast Asia and has been designated as a Center of Excellence in several fields, including Agriculture and Agricultural Engineering. As such, CLSU has expressed an interest in using renewable energy sources and advanced energy management technologies to support its on-going research in renewable energy technologies for agriculture. It sees its ability to produce its own energy on-campus as a way of reducing energy costs as well as a way to generate savings that can be used to support its free tuition program, among others.

With these in mind, FPIEC's proposed Project aims to address all these needs through the following:

1. Phase 1 – INSTALLATION OF SOLAR PHOTOVOLTAIC SYSTEM – FPIEC will install a solar photovoltaic ("Solar PV") system in the CLSU campus which will be located either on rooftops of existing buildings or on land to be designated by CLSU. FPIEC's and CLSU's technical teams are currently conducting detailed studies of the proposed sites and will recommend the most appropriate installation location. The results of the initial scoping are attached for your perusal.

   FPIEC proposes to install and operate the Solar PV system and supply the energy output to CLSU through FGES. The main objective is to provide power to CLSU that will be cheaper than power sourced from the Grid thus enabling CLSU to immediately realize savings from its power consumption.

2. Phase 2 – DEVELOPMENT OF A SMART CAMPUS ENERGY MANAGEMENT SYSTEM – Through FGES, FPIEC proposes to deploy, install and operate a smart campus energy management system to meet CLSU's energy management. For this, FPIEC can deploy equipment which can include, but will not be limited to, energy storage units, back-up diesel generators, smart meters, and control system infrastructures.
   The main objective of this energy management system is to provide granular, actionable insights throughout the CLSU system through various sensors and smart meters, and to automatically deploy all available energy resources to meet CLSU's power quality and reliability needs. Ultimately, this will support additional savings through the smart dispatch of energy assets.

The system that FPIEC proposes to develop will be designed to further enhance CLSU's research and development initiatives. It is FPIEC's vision to help CLSU develop research programs and activities in renewable energy in agriculture.

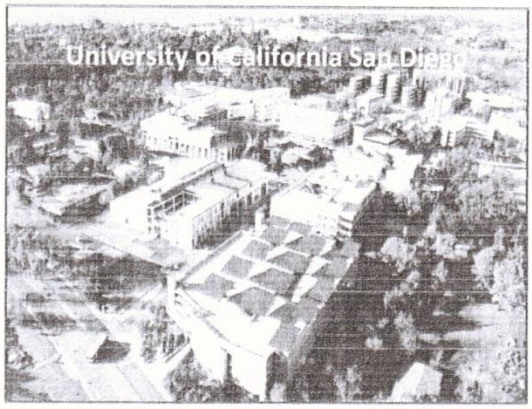
We would very much like to develop this Project with FGES and CLSU and would like to begin by providing solar energy related services at CLSU's main campus as part of your value-added services under the existing FGES contract with CLSU.

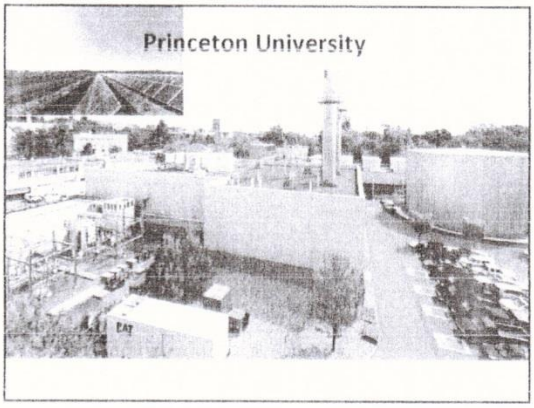
We look forward to your favorable response and the opportunity to work with FGES in bringing enhanced value offerings to CLSU.

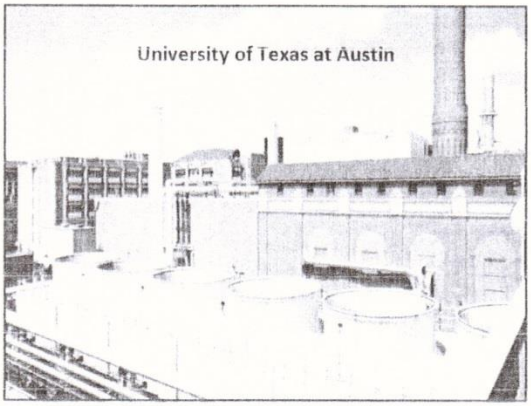
Very Truly Yours,

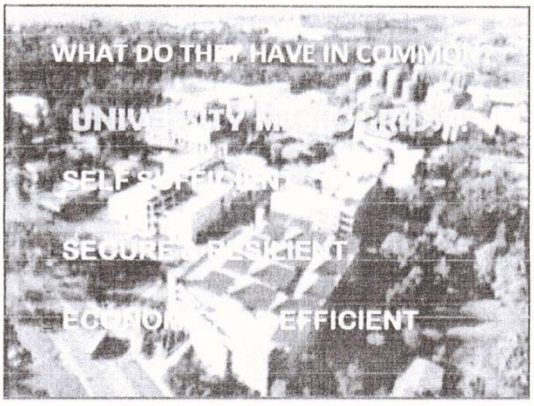
DENARDO M. CUAYO
Vice President

Presentation to
CLSU Admin Council

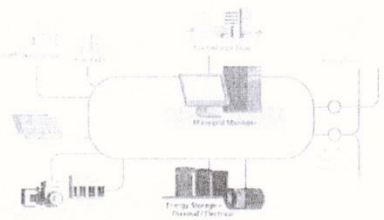




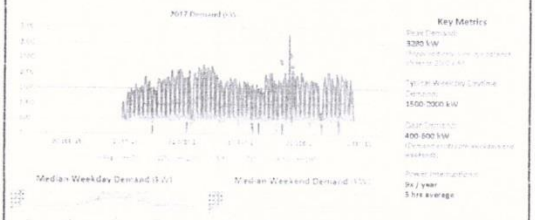




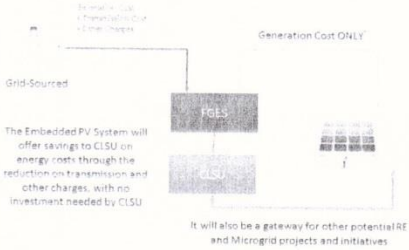
A SMART MICROGRID is a *local* energy grid where all energy resources are *automatically* controlled and optimally deployed via computer-based communications and automation technologies.



RECALL, THAT AN INITIAL ANALYSIS OF CLSU'S HISTORICAL LOAD DATA SHOWED SOME OPPORTUNITIES FOR ENERGY MANAGEMENT



THE FIRST PHASE OF DEVELOPING THIS SMART MICROGRID IS THE SOLAR PV INSTALLATION WHICH WILL ALLOW IMMEDIATE SAVINGS FOR CLSU

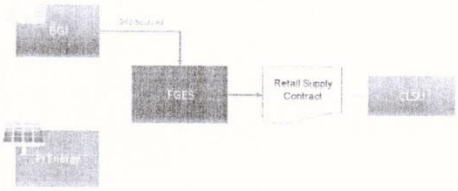


AS SUCH, FGES ASKED FOR CLSU ADCO'S APPROVAL LAST NOV 19, 2018 TO PROCEED WITH THE FEASIBILITY STUDY OF THE FIRST PHASE

Project road map

PHASE 1	PHASE 2	PHASE 3
INSTALLATION OF SOLAR PHOTOVOLTAIC SYSTEM	DEVELOPMENT OF A SMART CAMPUS MICROGRID SYSTEM	JOINT R&D AND CENTER OF EXECELLENCE IN AGRI BASED RE

WITH THE INTEGRATION OF SOLAR SUPPLY, PI ENERGY WILL EXECUTE A POWER SUPPLY CONTRACT WITH FGES

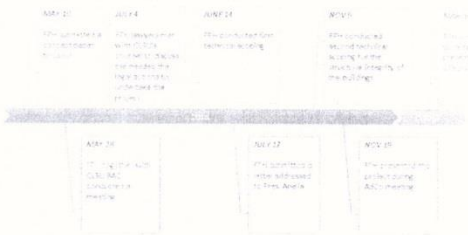


CLSU-FGES CONTRACT WILL NOW INVOLVE TWO RENEWABLE ENERGY SOURCES --- GEOTHERMAL AND SOLAR

FROM DECEMBER 2018 TO FEBRUARY 2019, THE TEAM CONDUCTED TECHNICAL AND COMMERCIAL ANALYSIS TO DETERMINE THE FEASIBILITY OF INSTALLING SOLAR PV ON CLSU'S BUILDINGS:

- TECHNICAL QUESTIONS
  - What is the best type of solar installation for CLSU?
  - How much Solar Capacity potential does CLSU have?
  - For ground mounted Solar PV, which location is best?
  - For rooftop PV, Which buildings can we put Solar Panels on?
  - How much output will the solar PV installation generate in a year?
- COMMERCIAL QUESTIONS
  - How much will CLSU be able to save on its monthly and annual electricity bill?
  - How will the solar rooftop system affect the NGCP contract?
  - What will happen after the FGES contract expires?

Project History

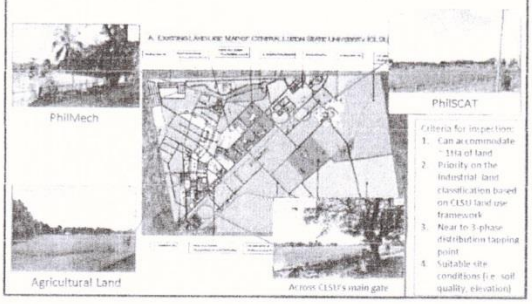


TECHNICAL ANALYSIS

DESIGN APPROACH FOR THE SOLAR PV SYSTEM IN CLSU

- The technical team inspected and evaluated two options for the solar system installation: (1)Ground-mounted PV, and (2)Rooftop PV.
- Both options are compared based on the technical feasibility, impact on the existing system, and economic viability.
- Each system is simulated using the ETAP software with the data collected from actual technical inspection.

CLSU RECOMMENDED FOUR POTENTIAL LOCATIONS FOR A ~1 MWP GROUND-MOUNTED PV INSTALLATION -TEAM USED 4-POINT CRITERIA TO ASSESS TECHNICAL FEASIBILITY

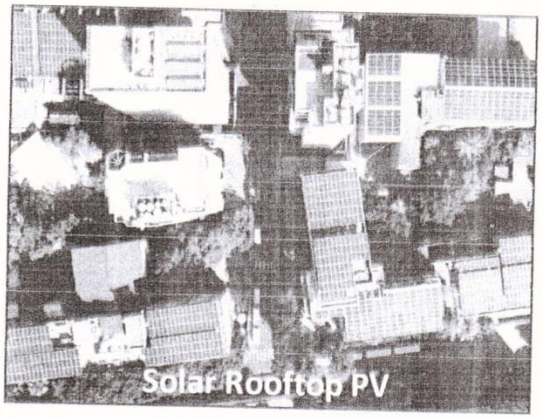


Four potential locations are inspected ~1 MWp for Ground-mounted PV installation

PhilScat	• Land currently leased by PhilSCAT; • Industrial classification; • Mainly for research and extension activities and application of post production and agricultural mechanization technologies
PhilMech	• Land currently leased by PhilMech; • Industrial classification; • Currently a fish pond area; • Mainly for research and extension activities and application of post production and agricultural mechanization technologies
Back of Umart	• Agricultural land; • Currently a rice field; • Agricultural classification
Across CLSU's main gate	• Agricultural land; • Currently a rice field; • Agricultural classification

BASED ON THE SELECTION CRITERIA, THE TEAM CONCLUDED THAT THE [] LOCATION SHOW HIGH POTENTIAL FOR A GROUND MOUNT SOLAR PV INSTALLATION

PhilSCAT	✓	✓ (under lease agreement with PhilSCAT)	✓	✓
PhilMech	✓	✓ (under lease agreement with PHILMECH)	✓	X (Lowest capacity because of shaded areas)
Back of Umart	✓	X (Land Conversion)	✓	X (Elevation is very low)
Across CLSU's main gate	✓	X (Land conversion)	✓	✓



USING THE LAND USE FRAMEWORK PLAN PROVIDED BY CLSU, THE TEAM ALSO INSPECTED 48 BUILDINGS TO ESTABLISH TECHNICAL FEASIBILITY OF A SOLAR ROOFTOP PV INSTALLATION USING A 3-POINT CRITERIA

SUMMARY Ocular Visit (July 4, 2018)

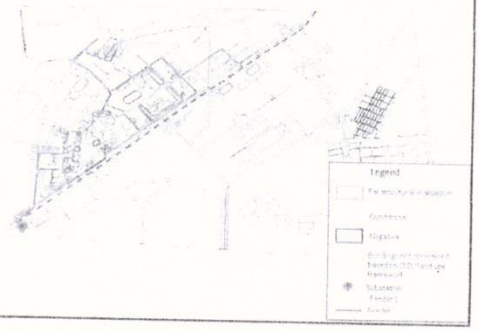
	No. of Buildings	Estimated Rooftop Area (sq. m.)	Aggregated Capacity (kWp)
For structural evaluation	24	24,438	1,884
Conditional	7	5,875	470
Negative	17	20,211	-
TOTAL	48	50,524	2,354

Criteria for roof evaluation (initial scoping)

1. Shading/possible obstruction of sunlight
2. Current condition of the building
3. Structural Condition of Roof

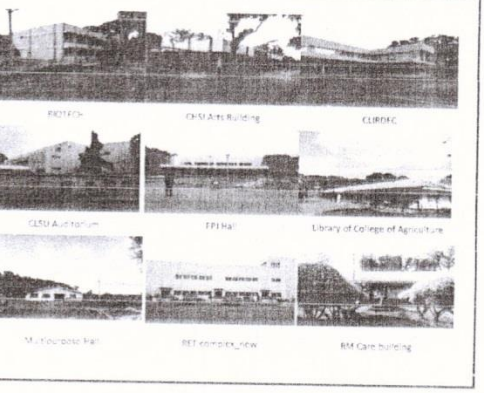
All the 24 buildings that passed the initial scoping are endorsed for structural analysis by a licensed structural engineer

USING THE LAND USE FRAMEWORK PLAN PROVIDED BY CLSU, THE TEAM ALSO INSPECTED 48 BUILDINGS TO ESTABLISH TECHNICAL FEASIBILITY OF A SOLAR ROOFTOP PV INSTALLATION USING A 3-POINT CRITERIA



LIST OF BUILDINGS TECHNICALLY FEASIBLE FOR SOLAR ROOFTOP INSTALLATION WAS FURTHER FILTERED FOR STRUCTURAL INTEGRITY AND OPTIMAL SIZING

Building Name	MAXIMUM CAPACITY
[illegible]	[illegible]
CHSI Arts Building	50.82
CLIRDEC	106.92
CLSU Auditorium	271.92
FPJ Hall	142.56
Library of College of Agriculture	142.56
Multi-purpose Hall	71.28
RET complex_new	59.4
Rm Care building	42.24
Umart	56.76
[illegible]	31.68
[illegible]	179
[illegible]	29.7
[illegible]	11.22
[illegible]	21.12
[illegible]	39.6
[illegible]	29.7
[illegible]	20.45
[illegible]	35.64
TOTAL	944.46

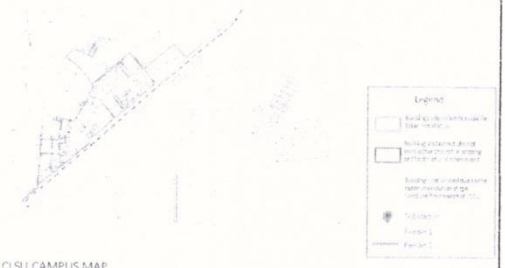


TO List of buildings which are technically feasible for solar installation

Building Name	MAXIMUM CAPACITY Capacity (kWp)
BIOTECH	50.82
CHSI Arts Building	106.92
CLIRDEC	271.92
CLSU Auditorium	142.56
FPJ Hall	142.56
Library of College of Agriculture	71.28
Multi-purpose Hall	59.4
RET complex_new	42.24
Rm Care building	56.76
Umart	31.68
Asean Dev.Comm Center Bldg	29.7
CHSI Events Place	11.22
CEC Hostel	21.12
Hatchery	39.6
Cold storage	29.7
Crop sci Bldg	20.45
Flora and Fauna Lab	35.64
TOTAL	1163.58

Given the maximum capacity of each building, the economic consideration per Watt-peak of Solar, the Team focuses on the buildings with **more than 40 kWp capacity**

LIST OF BUILDINGS TECHNICALLY FEASIBLE FOR SOLAR ROOFTOP INSTALLATION WAS FURTHER FILTERED FOR STRUCTURAL INTEGRITY AND OPTIMAL SIZING



CLSU CAMPUS MAP

GIVEN SITE DEVELOPMENT CONSTRAINTS, TEAM RECOMMENDS TO INSTALL ROOFTOP SOLAR PV FOR FIRST PHASE OF CLSU'S SMART MICROGRID PROJECT

Ground-mounted PV *(PhilSCAT)*	✓	✓	Under lease agreement with PhilSCAT	-Will need soil and geotechnical investigation -Will incur cost for backfill and additional substation
Rooftop PV *(9 buildings identified)*	✓	✓	No flagged implication	-Will incur cost on the modification of the distribution system and additional O&M and maintenance expenses

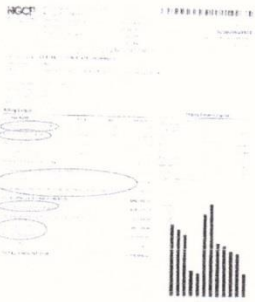
Based on the above comparison, the Team recommends to install Rooftop PV at the nine (9) buildings identified.

COMMERCIAL ANALYSIS

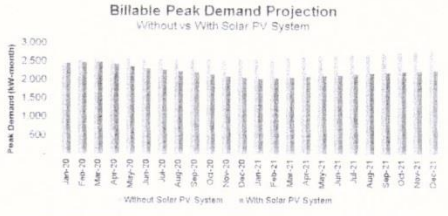
SOLAR PV INSTALLATION WILL BRING DOWN CLSU'S POWER COST BY REDUCING TRANSMISSION CHARGE COMPONENT - W/O SOLAR, AVERAGE NGCP BILL IS PHP1.4 MILLION

Reduction expected in the following charges:

- Power Delivery Service (PDS) Charge
- System Operator (SO) Charge
- Taxes
- Ancillary Service Charges
- Universal Charges & FIT-All Charges



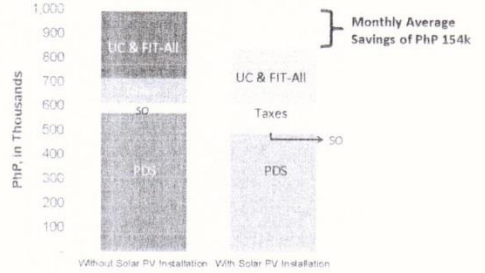
MORE SPECIFICALLY, SOLAR PV WILL REDUCE THE AMOUNT OF POWER TAKEN FROM THE GRID AND CONSEQUENTLY ON NGCP'S POWER DELIVERY SERVICE AND SYSTEM OPERATOR CHARGES



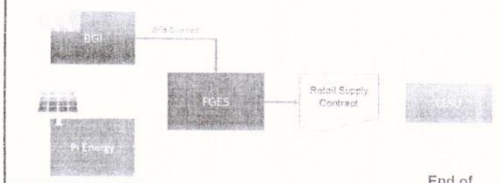
NOTE: Monthly Peak Demand is assumed to be equal to the Monthly Contracted Demand of CLSU under its RSC

Billing Determinant is the average of the 12 monthly non-coincident peak measured in 15-minute interval.

WE ESTIMATE POTENTIAL SAVINGS OF UP TO P180k PER MONTH ON CLSU's NGCP BILL OR UP TO 2 MILLION PHP/YR



OUR PROPOSED SOLAR PV INSTALLATION WILL PROVIDE CLSU VALUE THROUGH ITS FIXED AND PREDICTABLE RATE



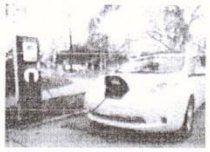
PROPOSED SOLAR RATE:

2019	2021	2026	End of SESC
OFF-PEAK Price: 2.83 P/kWh	OFF-PEAK Price: 2.68 P/kWh	OFF-PEAK Price: 2.55 P/kWh	OFF-PEAK Price: 2.55 P/kWh
PEAK Price: 7.28 P/kWh	PEAK Price: 7.13 P/kWh	PEAK Price: 6.94 P/kWh	PEAK Price: 6.94 P/kWh

PHASE 2: E-VEHICLE SYSTEM IN CLSU

Case Study: University of California San Diego Microgrid

- Potential storage opportunity for energy generated from solar.
- Currently, the university has 50 hybrid-electric cars, 5 fully electric cars, 3 charging stations.
- A vision is to provide **smart charging** systems through data gathering and analysis of commute behavior within the campus.
- The goal is to be carbon neutral by 2025.
- Currently, UCSD charges for around 800 EV drivers each month which represents 5,600 gallons of gasoline not used.



PHASE 2: CLSU CAMPUS MICROGRID PROJECT

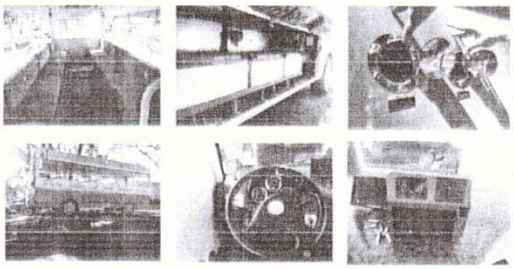
E-VEHICLE CONCEPT

In an effort to transform CLSU into a **smart campus**, e-vehicles can be integrated into the smart microgrid system to provide a less expensive and cleaner mode of transportation for the CLSU community.

An e-jeep + e-trike hybrid fleet can be explored to be implemented.

TEAM WILL NEED TO CONDUCT A STUDY TO DETERMINE THE PROJECT VIABILITY OF AN THE E-VEHICLE SYSTEM IN CLSU

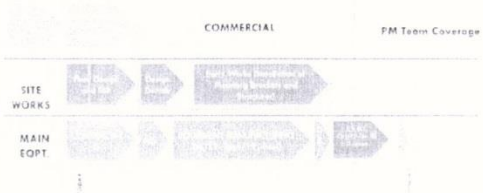
E-vehicle Demo in CLSU



WE REQUEST APPROVAL OF THE FOLLOWING NEXT STEPS:

1. Request approval to execute first phase
2. Draft and execute the MOA
3. Refine Project Timeline

Timeline of activities for the Solar PV System



MOA

- In line with Value Added Services provision
- Provide a Solar Microgrid Project within CLSU Campus
- Promote green energy, research/learning facility, savings
- Collaborate with FGES affiliate PI Energy for expertise
- Term: Co-terminus with the Service Contract with the DOE

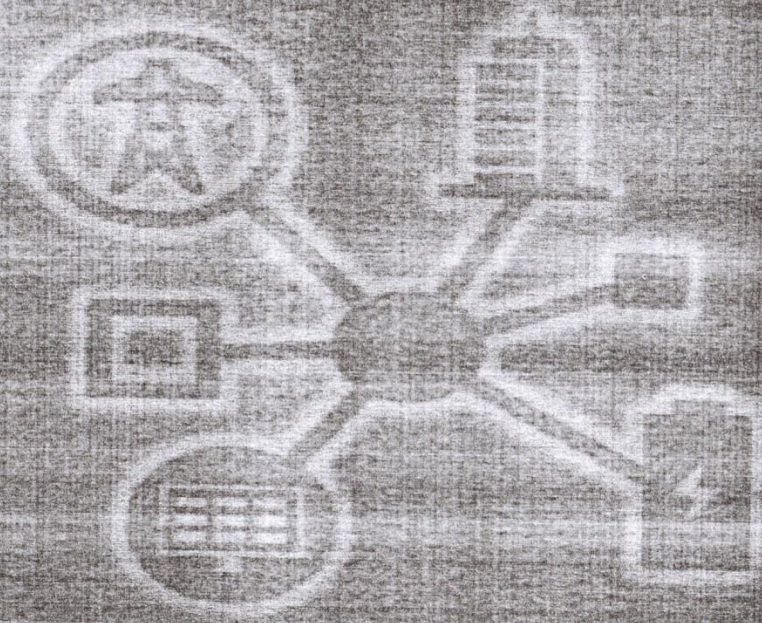
• Identify and set aside rooftops • Allow access to install, operate and maintain • Work with PI Energy in using Project for education	• Collaborate w/ PI Energy Implement the Project • Source electricity from Project • Be primarily responsible to CLSU	• Install, own, operate and maintain Project • Collaborate w/FGES • Work with CLSU in using Project for education • Supply electricity to CLSU

END OF PRESENTATION

THANK YOU VERY MUCH!

CENTRAL LUZON STATE UNIVERSITY

Smart Microgrids for Campus Applications



FGES, under its Retail Supply Contract (RSC), undertakes to provide value-adding services to CLSU

First Gen
Energy Solutions

CONTRACT

CENTRAL LUZON STATE UNIVERSITY 1907

Value Added Services / Priority Sourcing

14.20 The SUPPLIER shall, to the best of its ability, support the marketing efforts of CUSTOMER to promote energy efficiency and sustainability.

14.21 Without prejudice to the provisions of Section 14.22 and to the extent within the SUPPLIER'S expertise, the SUPPLIER shall grant the CUSTOMER priority-sourcing privileges for services, programs, or products geared towards the improvement of efficiency and reliability of CUSTOMER's operations, such as seminars and energy efficiency programs.

FGES is looking at FPIEC's Smart Microgrid Technology to enhance reliability of its RE supply to CLSU

First Gen
Energy Solutions

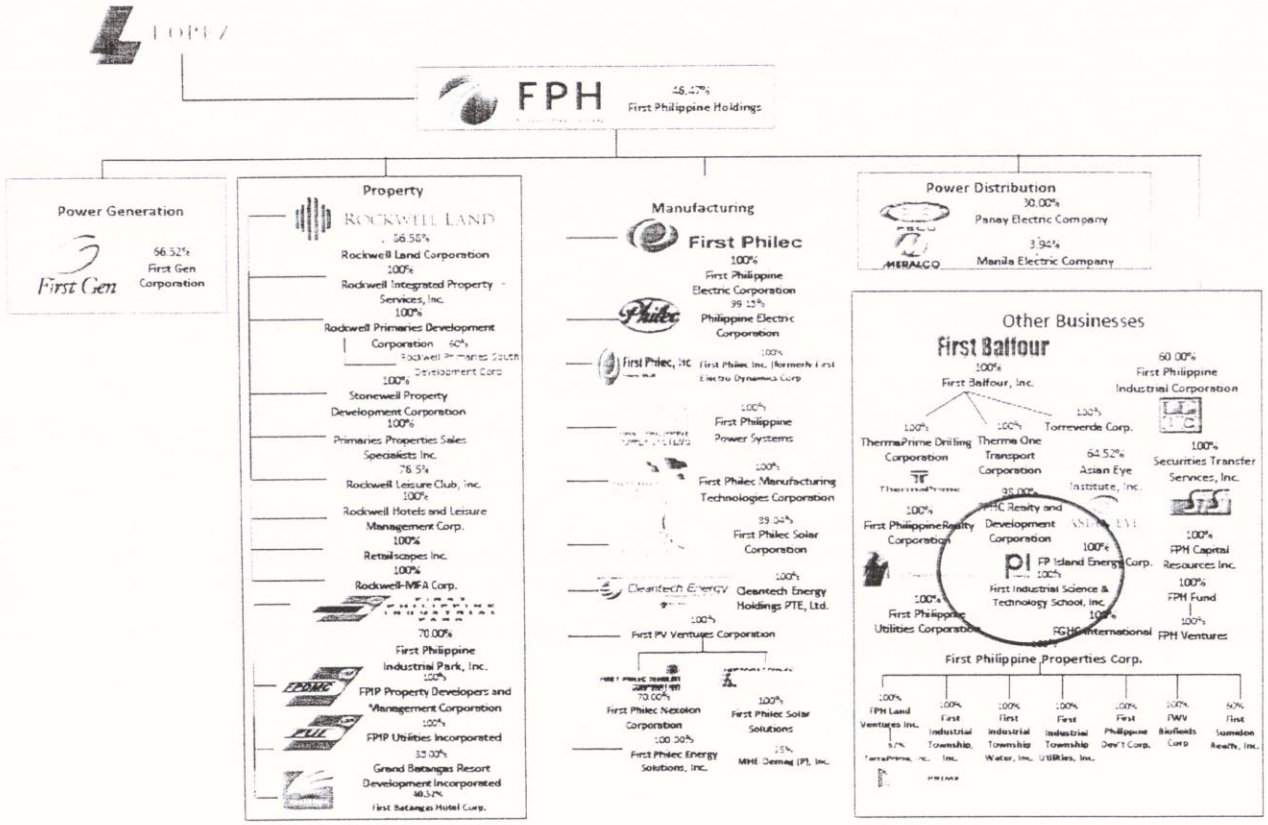
V Value
A Added
S Services

CENTRAL LUZON STATE UNIVERSITY 1907

pi energy

- **Feasibility Study**
- **Phase 1**: Installation of Solar Photovoltaic System
- **Phase 2**: Development of a Smart Campus Energy Management System

FPIEC is part of the Lopez group's First Philippine Holdings (FPH), with principal interests in broadcasting, energy, real estate, and manufacturing

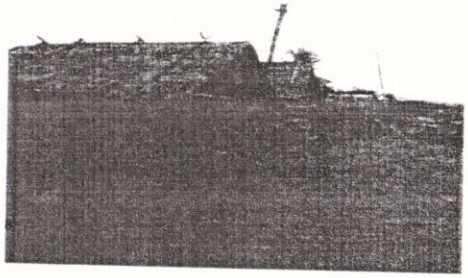


energy

- ✓ Wholly-owned subsidiary of First Philippine Holdings Corporation
- ✓ Engaged in the business of generating and supplying power from conventional and renewable energy resources utilizing advanced microgrid control technologies
- ✓ Currently undertaking a Qualified Third Party (QTP) project to provide electricity in the islands of Lahuy and Haponan in Caramoan and Quinalasag in Garchitorena

FPIEC to deploy Smart Microgrids for Rural Electrification and Development in Caramoan, Camarines, Sur

- 13 elementary schools
- 4 Health Clinics



Area Profile

- Population: 13,801
- Power provided by NPC Diesel Gen 4-6 hours per day

- Livelihood: 72% Fishing / Farming
- HH Monthly Income:
  - 89% < Php 10k
  - 63% < Php 5k

Solution is better than current situation and can be a catalyst for socio-economic growth

Smart Microgrid allows seamless entry of renewables – 40% from solar PV and Energy Storage; reducing reliance on expensive diesel generation

Reliable refrigeration and cold storage can be realized, improving crop and fishing yields, and reducing trips to the mainland for supplies

Utilities (water, telecomms) and Services (education, health) can be improved, providing further economic opportunities for the community

Accommodations and attractions can be developed, allowing for the island's deeper participation in the regions' developing tourism industry

Prepaid Metering will allow the people to be in better control of their budget and usage

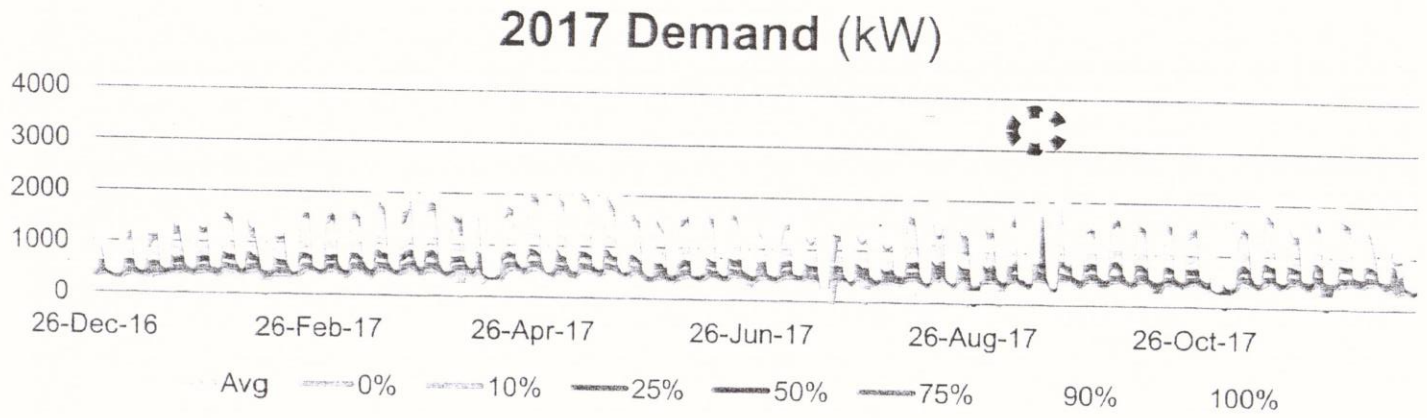
Executive Summary

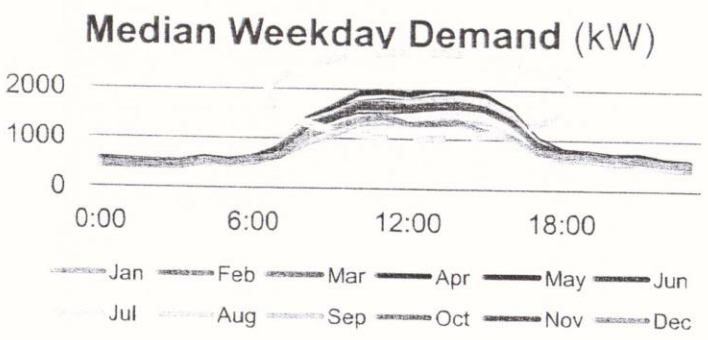
FGES, in coordination with FPIEC, proposes to undertake the installation and operation of the Solar PV system and supply the output energy to CLSU

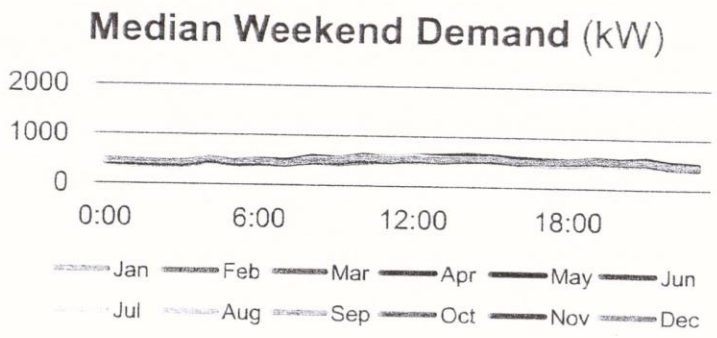
The project will utilize embedded PV systems and smart microgrid technologies to provide value-added services to CLSU

- Provide energy savings to CLSU by partially displacing grid-sourced power
- Allow for integration of back-up power sources for improved reliability and power quality
- Serve as a gateway for other potential RE and Microgrid projects and initiatives
- Allow for opportunities for CLSU to conduct R&D in Smart Campus and Renewable Energy technologies

Analysis of CLSU Historical Load data show some opportunities for energy management







Key Metrics

Peak Demand:
3280 kW
(happened only once, typical peak closer to 2300 kW)

Typical Weekday Daytime Demand:
1500-2000 kW

Base Demand:
400-600 kW
(Demand exists both weekdays and weekends)

Power Interruptions:
9x / year
5 hrs average

Analysis of CLSU Historical Load data show some opportunities for energy management

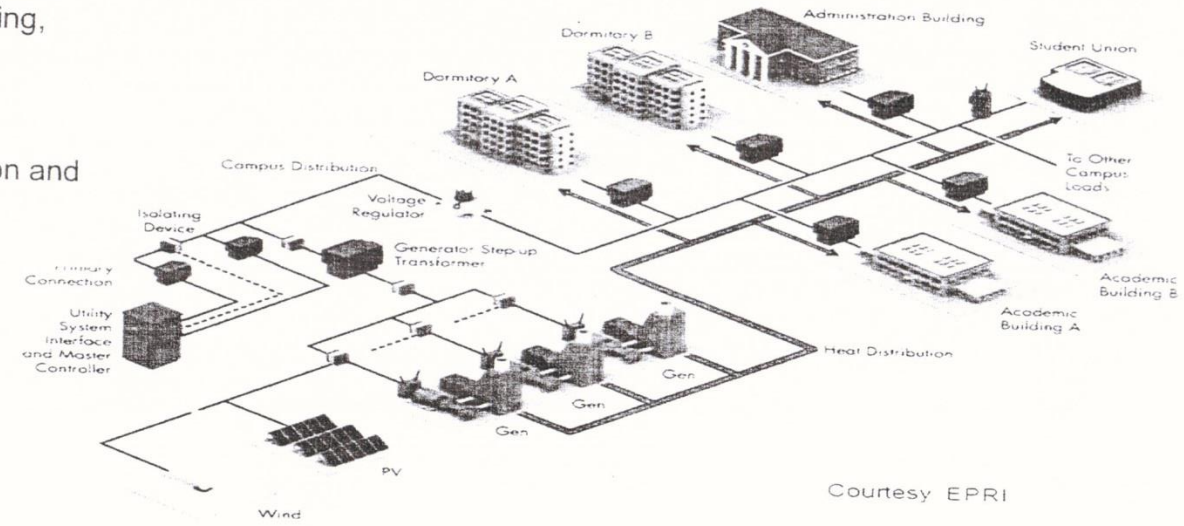
Minimizing Weekday Daytime Load and Peak to lower demand and energy charges

- Utilizing available RE resources such as rooftop PV, biomass
- Optimizing use of deferrable activities – water pumping, water treatment, etc.

Mitigating impact of power outages and protecting equipment

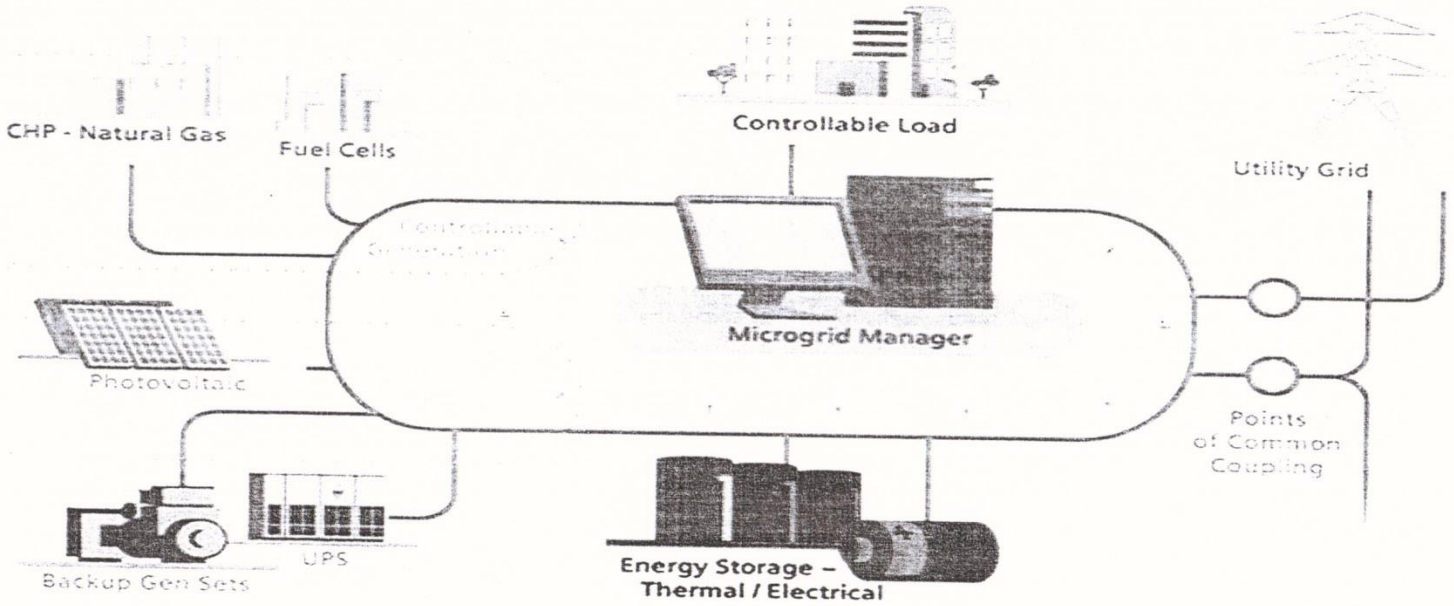
- Using backup generation and energy storage

A Smart Microgrid can integrate and manage the grid, generation, and loads

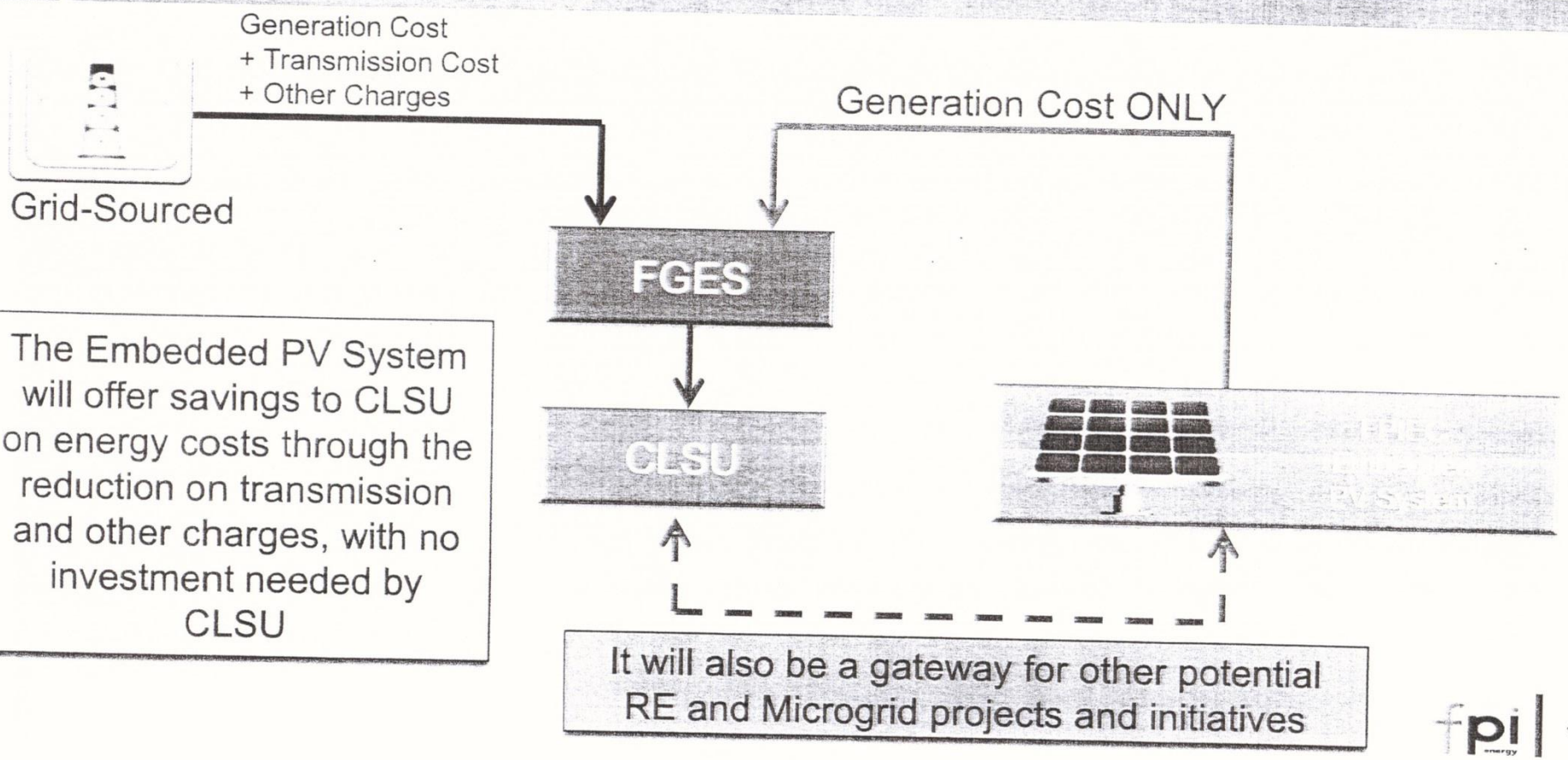


Courtesy EPRI

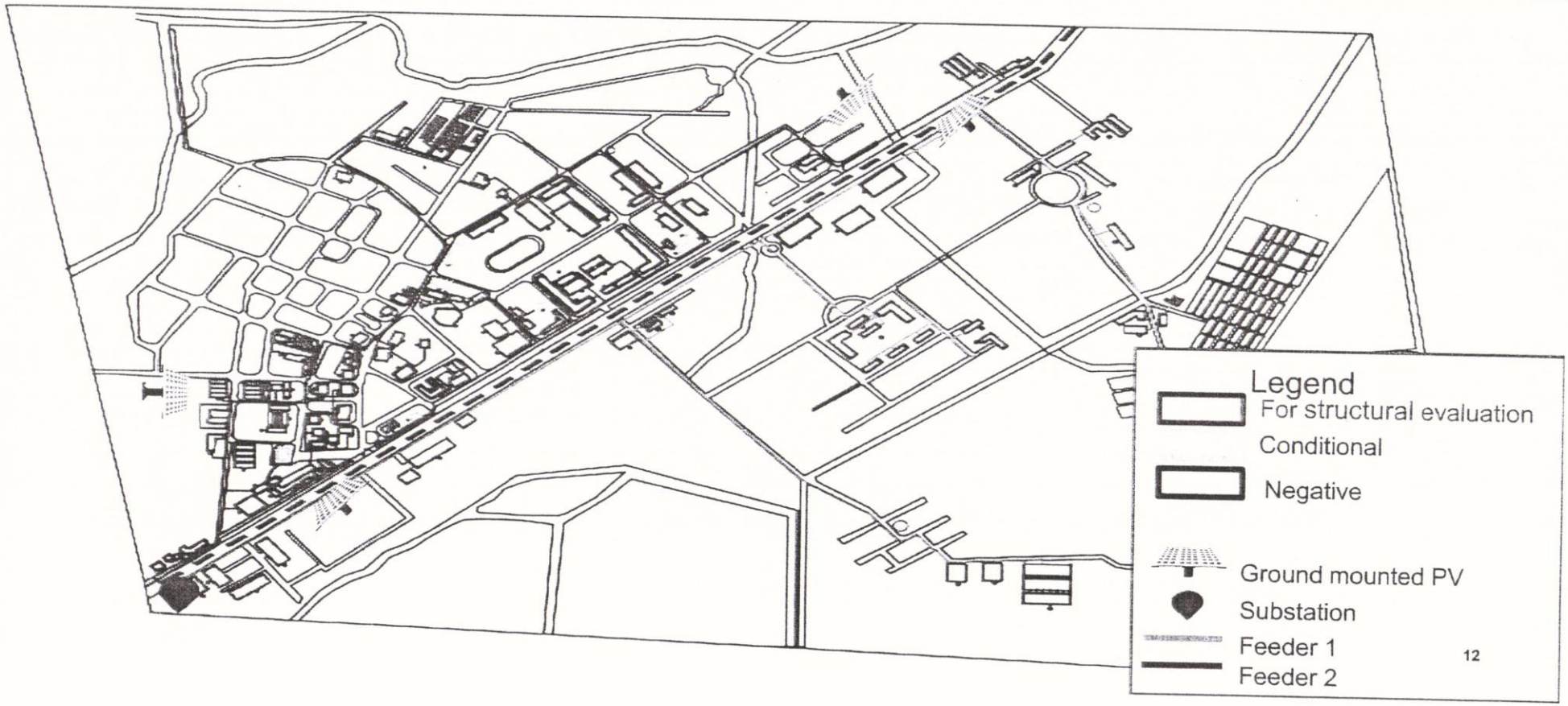
A SMART MICROGRID is a *local* energy grid where all energy resources are *automatically* controlled and optimally deployed via computer-based communications and automation technologies.



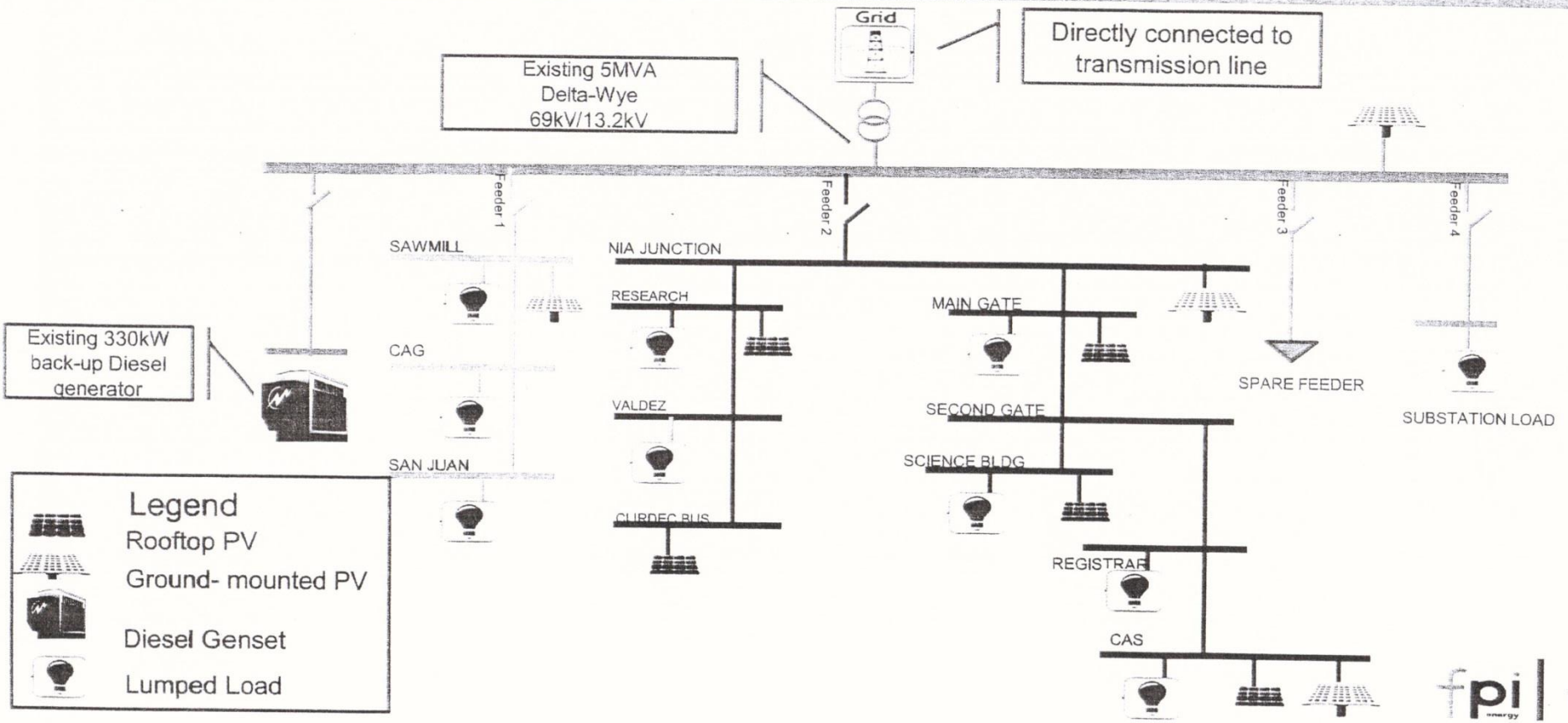
Initial Phase of PV Installation will allow immediate savings for CLSU



Preliminary technical scoping shows potential for ground-mounted and/or rooftop PV integration



Simplified single line diagram: Potential sites for PV Installation targeted



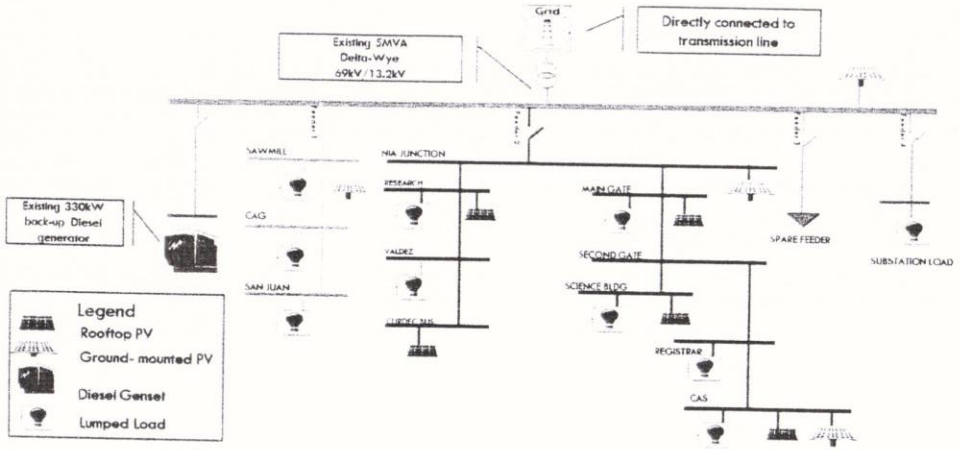
Potential Benefits of a Smart Microgrid System for CLSU

COST SAVINGS AND SUSTAINABILITY

- Seamless entry of available RE resources (Rooftop PVs, etc) to offset daytime pricing
- Management and reduction of peak demand
- Integration of dispatchable loads for optimal use

RELIABILITY AND POWER QUALITY

- Integration of back-up generator sets to maintain power on key sites
- Incorporation of Energy Storage to maintain Power Quality for sensitive assets and equipment



RESEARCH AND DEVELOPMENT

- Integration and incorporation of other generation assets in development (e.g. Biomass generation)
- Microgrid system as platform for further energy R&D

The project provides five key benefits for CLSU as a premier academic institution

✓ Renewable

- Embedded Solar
- Potential integration of other sources

✓ System Improvement

- System efficiency enhancement
- Reliability improvement

✓ Electric Bill Reduction + Savings

- Minimize transmission charges
- Optimize cost of generation

✓ Pioneer University in Microgrid Technology

- Enabling new technology, service and customer choice and participation

✓ Academic Research and Development

- Student development

Timetable of Activities for the Solar PV Installation

- System design and complete feasibility study will take up to 3 months to finish

- Procurement and construction are estimated to take 2.5 – 6 months, depending on the final scope of work, complexity of construction, and the chosen components for the project

Conclusion

FGES, in coordination with FPIEC, proposes to undertake the installation and operation of the Solar PV system and supply the output energy to CLSU

The project will utilize embedded PV systems and smart microgrid technologies to provide value-added services to CLSU

- Provide energy savings to CLSU by partially displacing grid-sourced power
- Allow for integration of back-up power sources for improved reliability and power quality
- Serve as a gateway for other potential RE and Microgrid projects and initiatives
- Allow for opportunities for CLSU to conduct R&D in Smart Campus and Renewable Energy technologies