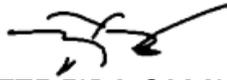


SUMMARY REPORT ON

**RENEWABLE ENERGY INNOVATION AND  
LEADERSHIP EXPERIENCE (REILE)**

A MAPUA UNIVERSITY INTERNATIONAL SUMMER SCHOOL

Prepared by:



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## **INTRODUCTION**

In the recent years, Mapua has strengthen its internationalization efforts by developing international programs (iPrograms) for both inbound and outbound students. One of these iPrograms is the **Renewable Energy Innovation and Leadership Experience or REILE** international summer school. REILE is a three-week program from July 8-26, 2019 focused on SOLAR, WIND and GEOTHERMAL energies designed to create the next generation of RE Leaders. In collaboration with Petro Energy Resources Corporation (PERC), REILE was developed to provide future energy leaders the practical knowledge by interacting with leading experts and the hands-on learning while visiting PERC facilities. It also offers a wide aspect of culture, history, business and society. It consists of the following:

- a. Classes – Philippine culture and society and professional courses;
- b. Plant visits to Maibarara Geothermal and PetroSolar Power Plants and Nabas Wind Farm of PERC as well as Wholesale Electricity Spot Market in Ortigas;
- c. Cultural and historical trips around the metro and the culminating activity in Boracay, Aklan.

Mapua gave a scholarship grant to two students each from six select international partner universities. The program cost is USD1000 for non-scholars and USD300 for scholars.

## **OBJECTIVES**

The main objective of the program is to create the next generation of energy leaders committed to transitioning the world into a sustainable energy future. More specifically, the program aims to:

- a. Promote educational tourism in the Philippines through renewable energy
- b. Create opportunities for research collaboration on renewable energy with international universities
- c. Create opportunities to support the renewable energy industry.
- d. Foster the internationalization of PHEIs through renewable energy

## **TARGET OUTCOMES**

- a. Increase in the inbound international students
- b. Increase in research collaboration between PHEIs, international universities and possibly the renewable energy industry.

## PROGRAM SCHEDULE

### WEEK 1: GEOTHERMAL

	Monday (July 8)	Tuesday (July 9)	Wednesday (July 10)	Thursday (July 11)	Friday (July 12)
	Venue: Mapua Seminar Room	Venue: Field, Clermont, 22nd flr, Discovery Suite, Ortigas	Venue: AM-Field, Clermont, 22nd flr, Discovery Suite, Ortigas PM-Mapua AVR2	Venue: Mapua S212B	Venue: Field, Maibarara Geothermal Power Plant, Batangas
9:00	Opening Ceremony	Lecture 1: The Philippine Energy Sector and Renewable Energy Development (DOE) by <b>Director Mario Marasigan</b>	Lecture 6: Geologic Nature and Exploration of Geothermal Resources at by <b>Maria Victoria M. Olivar</b>	Lecture 11: Surface Technology by <b>Engr. Elisa Eliazar</b>	PERC to lecture on the following @ MGIL Conference Room
10:30	Campus Tour	Lecture 2: Philippine Electric Power Industry by <b>Mr. Dave P. Gadiano</b>	Lecture 7: Basics of Geothermal Well Drilling by <b>Engr. Miguel B. Esberto</b>		Lecture 13: Steamfield Fluid Collection and ReInjection System: Design Considerations and the Maibarara Experience by <b>Engr. Pedro G. Callos, Jr.</b>
		Lecture 3: Project Cost and Economics of RE Investments in the Philippines by <b>Mr. Jerold Jay M. Flores</b>	Lecture 8: Basic Geothermal Reservoir Engineering and Well Testing by <b>Engr. Kennard M. Maturgo</b>		Lecture 14: Operational Features of the 32 MW Maibarara Geothermal Power Facility by <b>Engr. Paul Elmer C. Morala</b>
		Lecture 4: Electrical Power Transmission and Distribution in the Philippines by <b>Engr. Gerard Manuel (NGCP)</b>	Lecture 9: Geologic Setting, Development History, and Production Trends of the Maibarara Geothermal Field by <b>Ms. Lea Carmelia D. Fernandez</b>		Lecture 15: Environmental Aspects of Geothermal Development: Philippine Setting and the Maibarara Experience by <b>Mr. Erlito P. Del Rosario</b>
12:00	Lunch (personal)	Lunch (sponsored by PERC)	Lunch (sponsored by PERC)	Lunch (personal)	Lunch (sponsored by PERC)
1:30	Class on Philippine History and Culture <b>Prof. Geoffrey Cruz (SSSE)</b>	Lecture 5: Electrical Power Transmission and Distribution in the Philippines (NGCP) by <b>Engr. Gerard Manuel</b>	Lecture 10: Subsurface Technology by <b>Engr. Elisa Eliazar</b>	Lecture 12: Enhanced Geothermal Systems by <b>Engr. Elisa Eliazar</b>	Plant Visit
3:00	Intramuros Tour				
4:30					
6:00	Welcome Dinner @ Barbara's Heritage Restaurant				

**WEEK 2: SOLAR AND WIND**

	Monday (July 15)  Venue: Mapua AVR2	Tuesday (July 16)  Venue: Mapua AVR2	Wednesday (July 17)  Venue: Mapua AVR2	Thursday (July 18) Venue: Field AM-Sta. Maria, 5th flr, Discovery Suite, Ortigas PM- PEMC Office, Quezon City	Friday (July 19)  Venue: Field, Tarlac Solar Power Plant
9:00	Lecture 16: Overview of Solar/Wind Energy and Resource <b>by Dr. Michael C. Pacis</b>	Lecture 20: Microgrid Development Challenges in the Philippines <b>by Engr. Eugene Araullo (Meralco)</b>	Lecture 24: Tidal Energy <b>by Dr. Seyed Hamed Hashemi Sohi</b>	Lecture 26: Harnessing the Sun thru Technology-Driven Innovations <b>by Aldwin Labuga / Junrhey Castro (Trina Solar)</b>	PERC to lecture on the following:  Lecture 29: Development of the 70MWp Tarlac Solar Power Project <b>by Engr. Fermin B. Chavez</b>
10:30	Lecture 17: Introduction to Smart Grid Technologies <b>by Dr. Michael C. Pacis</b>	Lecture 21: Battery Energy Storage and PV Applications <b>by Engr. Jesusito H. Sulit</b>	Lecture 25: Tidal Energy Resource Assessment <b>by Dr. Seyed Hamed Hashemi Sohi</b>	Lecture 27: Project Development of Variable Renewable Energy: Wind & Solar Power Projects <b>by Claris T. Canta</b>  Lecture 28: Funding of RE Projects: The PetroEnergy Group Experience <b>by Maria Cecilia L. Diaz de Rivera</b>	Lecture 30: Operations & Maintenance Practices in a Grid-Connected Solar Plant: the 70MWDC Tarlac Solar Power Project <b>by Engr. Joed E. Bay</b>  Lecture 31: Integrating CSR towards Peace and Development in Hacienda Luisita: The PetroSolar Experience <b>by Yrel V. Ventura, et. al</b>
12:00	Lunch (personal)	Lunch (personal)	Lunch (personal)	Lunch (sponsored by PERC)	Lunch (sponsored by PERC)
1:30	Lecture 18: Parabolic Trough Solar Collector <b>by Engr. Igmedio Isla</b>	Lecture 22: Solar Energy <b>by Engr. Jesusito H. Sulit</b>	Cultural Immersion "Larong Pinoy/Filipino Games" @ Gymnasium	Visit to Wholesale Electricity Spot Market	Plant Visit
3:00	Lecture 19: PV Integration into the Grid as it meets the Demand <b>by Dr. Gorgonio C. Vallesteros II</b>	Lecture 23: Wind Energy <b>by Engr. Jesusito H. Sulit</b>			
4:30		Pre-departure orientation for Ilocos and Boracay Tours			

**WEEK 3 TOURS AND PLANT VISITS**

	Sunday (July 21) Venue: Field, Ilocos	Monday (July 22) Venue: Field, Ilocos	Tuesday (July 23) Venue: Field, Ilocos	Wednesday (July 24) Venue: Field, Boracay	Thursday (July 25) Venue: Field, Nabas Aklan
9:00	ETD from Manila to Ilocos at 2AM	Breakfast at Hotel	Breakfast at Hotel Check-out from Hotel	Flight from Manila to Boracay Flight Number: Z2 711 Departure time: 09:40 Arrival time: 10:55	Breakfast at hotel Travel to Nabas Aklan
10:30	Breakfast at Sison Pangasinan  Lunch at Vigan City  Vigan Tour (Bantay Church Tower, Baluarte ni Singson, Pagburnayan and Calle Crisologo)	Pagudpod Tour (Sta. Monica Church, Burgos Lighthouse, Kapurpurawan Rock Formation)  Plant Visit: Bangui Wind Farm	Loag City Tour (St. William Cathedral, Sinking Bell Tower, Sand Dunes (optional: 4x4 ATV Php2500/hr/jeep for 4 pax), Malacanang of the North)	-----  Check-in at hotel (Tonglen Beach Resort) Free time Lunch Free time Dinner	PERC to lecture on the following at PWEI Site Office, Nabas, Aklan  Lecture 32: Development Overview and Key Features of the 36 MW Nabas-1 Wind Power Project by <b>Engr. Jose V. Villena, Jr.</b> Lecture 33: Fundamentals of Wind Farm Operations and Maintenance: The Case of the Nabas Wind Power Project by <b>Engr. Jayson A. Abaniel</b>
12:00	Check-in at Laoag hotel Dinner	Lunch at Pagudpod  Continuation of tour (Patapat Viaduct, Paraiso ni Anton, Blue Lagoon, Timmangtang Rock, Bantay Abot & Dos Hermanos)	Lunch  Travel back to Manila at 1:30pm		Lecture 34: Transformation of an Isolated Village to a Progressive Community: PWEI's 36 MW Nabas Wind Project and Brgy. Pawa, Nabas, Aklan by <b>Yrel V. Ventura, et.al</b>
1:30		Return to hotel Dinner			Plant Visit
3:00					Lunch (sponsored by PERC)
4:30					Cultural and Culminating Activity at hotel  -presentation of reports and awarding of certificates

**GUEST SPEAKERS AND LECTURERS**

a. From the Government

1. Director Mario Marasigan - Officer In-Charge of the Electric Power Industry Management Bureau (EPIMB) of the Philippine Department of Energy (PDOE)

b. From the Industry

1. Aldwin J. Labuga - Project Development Manager of Trina Solar
2. Josell F. Co - Knowledge Management Specialist of Independent Electricity Market Operator of the Philippines (IEMOP)
3. Engr. Eugene Araullo – Technology Innovation Head of Meralco Spectrum, Inc., Senior Program Consultant of Meralco Power Academy Inc., and the Vice

President of the Institute of the Integrated Electrical Engineers of the Philippines.

4. Engr. Ivan Jeff Soberano – OIC-RCC Power Dispatch Senior Principal Engineer Luzon Regional Control Center, National Grid Corporation of the Philippines
- c. From PERC
1. Ms. Maria Victoria M. Olivar – Assistant Vice President Technical Affairs of PERC
  2. Engr. Paul Elmer C. Morala – Assistant Vice President for Power Plant Operations of PetroGreen Energy Corporation (PGEC)
  3. Ms. Claris T. Canta – New Ventures Senior Officer of PERC
  4. Mr. Yrel V. Ventura – Environment and Community Relations Manager of PGEC
  5. Engr. Miguel B. Esberto – Geothermal Reservoir Engineer and a Consultant for Maibarara Geothermal, Inc. (MGI)
  6. Engr. Kennard M. Maturgo – Reservoir Supervisor of MGI
  7. Ms. Lea Carmelia D. Fernandez – Geoscience Supervisor of MGI
  8. Engr. Pedro G. Callos, Jr. – Steamfield Manager of MGI
  9. Mr. Erlito P. Del Rosario – Environment and Community Relations Consultant for MGI
  10. Ms. Maria Cecillia L. Diaz De Rivera – Head of Finance of MGI
  11. Engr. Fermin B. Chavez – Project Manager of PetroSolar Corporation (PSC)
  12. Engr. Joed E. Bay – Site Mechanical Engineer of PSC
  13. Engr. Jose V. Villena, Jr. – Sr. Project Manager of Petrowind Energy, Inc. (PWEI)
  14. Engr. Jayson A. Abaniel – SCADA Superintendent of PWEI
- d. From Mapua
1. Engr. Elisa G. Eleazar – School of Chemical, Biological, and Materials Engineering and Sciences
  2. Dr. Michael C. Pacis – School of Electrical, Electronics, and Computer Engineering
  3. Dr. Gorgonio C. Vallesteros II - School of Electrical, Electronics, and Computer Engineering
  4. Engr. Jesusito H. Sulit - School of Electrical, Electronics, and Computer Engineering
  5. Engr. Igmedio F. Isla, Jr. – School of Mechanical and Manufacturing Engineering
  6. Dr. Seyed Hamed Hashemi Sohi - School of Mechanical and Manufacturing Engineering

### LIST OF PARTICIPANTS

REILE has twenty (20) participants from six (6) international university partners of Mapúa University. The names and their respective universities are listed below.

COUNTRY	UNIVERSITY	NAME
CHINA	Zhejiang Business Technology Institute	Lingyun Wei
	Zhejiang Business Technology Institute	Xuanlin Jin
	Zhejiang Business Technology Institute	Jieer Zheng
	Zhejiang Business Technology Institute	Guojun Huang
	Zhejiang Business Technology Institute	Hongxi Wu
	Zhejiang Business Technology Institute	Zhengwei Cai
	Zhejiang Business Technology Institute	Huan Zhang
	Zhejiang Business Technology Institute	Hanfeng Weng
	Zhejiang Business Technology Institute	Xiao Shen
	Zhejiang Business Technology Institute	Qihao Wang
	Zhejiang Business Technology Institute	Ziqiang Yu
INDONESIA	Institut Teknologi Sepuluh Nopember	Citra Ashilla Zahrantiara
JAPAN	Okayama University of Science	Yusuke Miyamoto
	Okayama University of Science	Masanao Nakamura
KOREA	Chung-Ang University	Youngyun Kim
	University of Southern Denmark	Andreas Simoni Huse Pedersen

DENMARK	University of Southern Denmark	Kasper Leerbæk Jørstad
DENMARK	University of Southern Denmark	Simon Hedegård Jessen
	University of Southern Denmark	Kathrine Lau Jørgensen
MALAYSIA	University Technology PETRONAS	Bilawal Ahmed

**REILE BANNER**



The banner features a blue background with a white torn-paper effect. At the top left, it displays the logos for MAPUA UNIVERSITY and PetroEnergy (PETROENERGY RESOURCES CORPORATION). The central text reads "RENEWABLE ENERGY INNOVATION AND LEADERSHIP EXPERIENCE 2019" in large blue letters, with "JULY 8-26, 2019" below it in green. To the left of the text is the REILE logo, which includes a wind turbine icon and the text "REILE" and "MAPUA UNIVERSITY OFFICE OF INTERNATIONAL CAREER AND EXCHANGE PROGRAMS". At the bottom, three circular images showcase renewable energy projects: a geothermal power plant, a solar farm, and a wind farm. Below each image is a caption: "32MW Maibarara Geothermal Power Project", "50MWDC Tarlac-1 Solar Power Project", and "36MW Nabas-1 Wind Power Project". The CINA logo is visible at the bottom center.

**PICTURES OF THE ACTIVITIES**

**A. Opening Ceremony**



**B. Lecture**



**C. Maibarara Geothermal Plant Visit**





**D. PetroSolar Power Plant Visit**



E. Bangui Wind Farm and Ilocos Tour



F. Nabas Wind Farm Plant Visit



**G. Culminating Activity and Graduation Ceremony**



