

**SUMMER IMMERSION IN MANILA AND BORACAY
(An industry driven course)**

**RENEWABLE ENERGY AND IT'S BENEFIT TO BUSINESS AND THE
ENVIRONMENT**

DATE: MARCH 13 TO MARCH 25, 2024



ACCRONYM : REBBE

TITLE : Renewable energy and it's benefit to business and the environment

DURATION : 2 weeks

DEVELOPED IN COLLABORATION WITH THE INDUSTRY: Petro Energy Resources Corporation (PERC)

Number of Students: 14

COURSE OVERVIEW

Global warming and its dire consequences for life is a common challenge confronting all nations. The diverse conditions prevailing in different parts of the world as a function of geological characteristics, geographic location, and levels of economic development call for differentiated actions for reduction of carbon emissions to prevent global temperatures from rising beyond 2°C. Healthy societies and healthy markets go hand-in-hand. Hence the reason, business should prioritise this agenda.

According to the US Energy Information Administration, renewable energy is “energy from sources that are naturally replenishing but flow-limited; renewable resources are virtually inexhaustible in duration but limited in the amount of energy that is available per unit in time.” Renewable or clean energy comes from natural sources such as biomass, hydropower, geothermal, wind, and solar energy.

Renewable energy is important to any country and Philippines is no exception. Renewable energy is key to the development of the energy industry and the sustainable and equitable



future that future generations of Filipinos deserve. This is certainly crucial not only for urban areas like Manila, Cebu, and Davao but also for the economic activity it can generate in off-grid communities scattered throughout the Philippine's archipelago.



Investing in renewable energy is one of the country's priorities in order to alleviate several problems it faces. The Philippines, alongside Indonesia, are the countries with the highest concentration of geothermal power generation in Asia. For one, it could provide a much-needed economic boost and quell fears of a U-shaped recovery. According to the [World Economic Forum](#), citing numbers from the International Renewable Energy Agency (IRENA), every dollar invested in the clean energy transition provides 3-8 times the return. It also creates employment opportunities, reduce health risks, provides

COLLABORATION WITH INDUSTRY

This summer immersion was developed in collaboration with the industry, hence it's uniqueness. In collaboration with Petro Energy Resources Corporation (PERC), REBBE was developed to expose and equip participants with the practical knowledge of renewable energy and also networking opportunities with leading experts who will be sharing their industry and real world knowledge. Participants will also get hands-on learning while visiting PERC facilities and other industry sites. In addition to this, this summer immersion has been designed to include exposure to cultural immersion in Philippines.

Specific components of the program include the following:



Culture	<ul style="list-style-type: none"> a. An introduction to Philippine culture and society as well as a walking classroom to visit some historical sites. b. Activity in Boracay Island, Aklan
Renewable Energy	<ul style="list-style-type: none"> a. Awareness on Geothermal, Solar, Wind and Bioenergy b. Real time exposure to the benefit of renewable energy, it's design, operational considerations, and funding through industry specific lectures
Social Innovation	<ul style="list-style-type: none"> a. Industry session -Citizen driven social innovation project to learn how farmers in Philippines were being engaged in Rice Straw energy.
Communication	<ul style="list-style-type: none"> a. Raising awareness and Inspiring Action
Field Trips	<ul style="list-style-type: none"> a. Plant visits to Maibarara Geothermal and PetroSolar Power to understand the intricacies of geothermal energy. b. Excursion to Plants and Nabas Wind Farm of PERC c. Excursion to Wholesale Electricity Spot Market in Ortigas

Boracay Island, Aklan



OBJECTIVES

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

- a. Explore the historical and environmental factors that shaped Philippines as a country.



- b. Create an understanding of how renewable energy is key to the development of an equitable future for the Philippines.
- c. Appreciate how Philippines is gradually moving towards a more sustainable diversified energy portfolio
- d. Understand how renewable energy benefits the business and the environment
- e. Analyse the potential of renewable energy in the Philippines

LEARNING OUTCOMES

This short immersion course comprises of lectures, discussion, field trips and group work. At the end of this course, students will be able to

- 1) Analyse the principle and technologies of renewable energy options
- 2) Propose solutions and innovations in renewable energy
- 3) Appreciate the potential of social innovation networks.
- 4) Determine the appropriate energy solution with consideration of social, cultural, environmental, and economic factors.
- 5) Analyse the advantages and disadvantages of the various renewable energy options

WRAPPER COURSE SUGGESTION

This course could also serve as a field course for any of the following modules:

SES 141	Energy and Everyday Life
GPH 314	Global Change
EGR 475	Alternative Energy
SOS 324	Sustainable Energy, Technology and Systems

ASSESSMENT MODE AND WEIGHTAGE

Students will be assessed according to the following components:

Assessment item	VALUE %
Exam 1: Philippine Culture and History	20
Exam 2: Renewable Energy	20
Practice 1: Case Study on Geothermal Renewable Energy	10
Practice 2: Discussion on the Potential for Social Innovation in Renewable Energy	10
Group project: sustainable energy solutions and innovation that will benefit businesses	10
Field work/data gathering	10
Final paper	10
Oral presentation participation	10
TOTAL	100



Exam 1 (20%): A first written examination will be given based on material analysed in lectures, discussions, readings, and field exercises regarding Philippine history and culture.

Exam 2 (20%): A second written examination will be given based on material analysed in lectures, discussions, readings, and field exercises about renewable energy

Practice 1 (10%): We will grade students' active participation and application of knowledge during the hands-on case study discussion on Geothermal Energy in the Maibarara Facility

Practice 2 (10%): We will grade students' active participation and application of knowledge during the hands-on case study discussion during the farmer's rice straw energy project.

Group project (30%): Students will work in groups to propose sustainable energy solutions and innovation that will benefit businesses. The project's final grade considers fieldwork, a final written paper, and an oral presentation of the proposal. Each aspect provides one third of the final grade.

Students are required to meet the deadlines established by the lecturers at the beginning of the short program.

Students will receive transcripts for the short program and a certificate of approval if minimum grades are acquired.

GRADES CONVERSION

GRADES CONVERSION	FAIL	SUFFICIENT	GOOD	VERY GOOD	EXCELLENT
MAPUA	0-69	70 - 76	77 - 86	87 - 92	93 - 100
ASU	F	C - C+	B - B	B+ - B+	A

COURSE OUTLINE

Type : L=Lecture, FL=Field Lecture (Industry driven)

FL =Field Trip

P=Practical

Day	Teaching and Learning Activities	Location	Type	Contact Hours
1	Introductory Activities Philippine Culture and History -Philippines Culture and History -Filipino and Spanish Catholic traditions -Appreciation of art, music and food	Mapua Makati	L	4h



	Walking tour to historical sites -Cultural Immersion to Philippines culture and tradition	Intramuros Tour (San Agustin Church and Manila Cathedral), Fort Santiago, Rizal Park	FL	4h
	Dinner	Barbara's (with Filipino Cultural Dance)	F	2h
2	Renewable Energy -What is renewable energy -Why is energy renewable -Types of renewable energy -Future of energy	Mapua Makati	L	8h
	Philippines National Renewable Energy -Sustainable Development Goal 7 -The Philippines Renewable Energy Sector -The INFF-Joint Development Program implemented by UNDP, UNFPA, ENKEF -Renewable energy in the Philippines: Current State and Future Roadmap			
3-4	Power Industry -The commercial elements of a power industry	Mapua Makati	L	1h
	Geothermal Energy -What is Geothermal Energy 0-Geothermal Nature, Exploration and Resources -How does a geothermal power plant work -Analysis how a geothermal power system works in comparison with other energy systems		L	3h
	<i>Case Study : Environmental Aspects of Geothermal Development: Philippine setting and the Maibarara experience</i>		P	3h



	Project Development of Variable Renewable Energy: Wind & Solar Power Projects		P	4h
11	Departure to Boracay Field Trip to Nabas Wind Farm Visit, Aklan -Understand and apply knowledge gained in wind energy	Aklan	FL	8 h
12-13	Closing Ceremonies Rest and Recreation	Boracay		2h Free Time
14	Return to Manila			

Field Trips and Industry Immersion

The following field trips have been organised as part of exposure to real world knowledge and industry immersion.

1. Malibarara Facility, Ortigas
2. Nabas Wind Farm Visit, Aklan

Historical Sites

A visit to the following historical sites have been prepared

1. Intramuros
 - a. San Agustin Church
 - b. Manila Cathedral
 - c. Fort Santiago
2. Rizal Park

Cultural Immersion

The following activities have been prepared

1. Boracay Beach
2. Dinner at Barbara's: watching Filipino Cultural Dances and eating Filipino food



COSTING

Summer Tour Package Cost Per Student

Room Rental:	12,500	10 days @ Makati
Food:	10,000	14 days
Fare:		
Makati-Intramuros	500	1 day trip
Makati-MCL	1,875	3 days
Makati-Batangas	700	1 day trip
Caticlan - Nabas	500	1 day trip
Airfare	7,000	Round Trip Manila-Caticlan airport
Boat Ride @ Boracay	500	Round Trip
Hotel: 4 days	8,414.14	4 days and 3 night only
Entrance Fee	550	Museum and Fort Santiago
Dinner Barbaras	750	Average per head
Package Tour	1,500	Per Head
Environmental Fee	50	Per head
Tour Guide Fee	60	Per Head
Total Peso:	P44,899.14	
USD @ 58	\$774.12	

* Prices may change without notice

References

1. ASU Content Repository. <https://programs.cintana.asu.edu/>
2. Grinell, S. (2016). *Renewable Energy and Sustainable Design*, Cengage Learning.
3. Speight, J. G. (2022). *Encyclopedia of Renewable Energy*, Wiley.

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