

Introductory Course on Ocean Renewable Energy: New Entrants into the Southeast Asia Marine and Offshore Energy Market

7 June 2018

Pasig Room 14/F Lopez Building, Meralco Ortigas Center,
Pasig City, Philippines

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INTRODUCTION

The Southeast Asian (SEA) region has an ambitious target of tripling its renewable energy power generation by 2025. Marine renewable energy, as an emerging energy source, has not been as widely known as other renewable technologies such as hydro, geothermal, solar and wind.

Marine renewable energy is a classification of renewable energies whose sources originate from the marine environment. It includes tidal energy, wave energy, salinity gradient and ocean thermal energy conversion. Each kind has its own characteristics and require specific devices to harness the different types of energy. It is well suited to the SEA region due to the proximity of many countries to large bodies of ocean.

Given the growth in demand for power, marine renewable energy represents an attractive investment opportunity. Collaboration amongst industry, government, academe and supply chain stakeholders will be critical to more widespread adoption.

28 participants, 5 resource speakers from 4 countries participated in the workshop.



OBJECTIVES

The workshop looks at equipping the participants with adequate knowledge about ocean renewable energy, specifically tidal and wave energy. At the end of the workshop, the participants are expected to:

- Understand the principles and concepts related to ocean renewable energy, specifically tidal and wave energy
- Describe resource assessment, environment impact assessment, conversion technologies, and economics of ocean renewable energy
- Be well-oriented with ocean renewable energy industry including the supply chain involved in project planning, commissioning, operations and maintenance and decommissioning
- Appreciate the opportunities of ocean renewable energy in Southeast Asia
- Identify market entry challenges and potential risks of ocean renewable energy in Southeast Asia

SUMMARY OF THE PRESENTATIONS & DISCUSSIONS

SESSION 1: INTRODUCTION TO OCEAN RENEWABLE ENERGY (ORE) & THE ORE INDUSTRY

This session is presented by Dr Martin Koh, Hydrodynamic Engineer, OceanPixel Pte Ltd (Singapore). The objective of this session was for participants to get an overview of the different types of ocean renewable energy (ORE), the processes and the technology each involves. The following types were covered in this session: floating solar (photovoltaic) wave, tidal range, tidal stream, OTEC (ocean thermal energy conversion), salinity gradient, offshore wind. By the end of this session, participants were familiarized with what ocean renewable energy is, its different types, technology and the status of each type across the globe.

SESSION 2: MARKET OPPORTUNITIES & CHALLENGES OF OCEAN RENEWABLE ENERGY IN SOUTHEAST ASIA

This session is presented by Ms. Marianne Eleanor A Catanyag, Program Manager, OceanPixel Pte Ltd. The session includes an overview of the status on ocean renewable energy in Southeast Asia (resource and technology) and an in-depth discussion and analysis of few ORE projects in the Philippines using PESTLE Analysis (Political, Economic, Socio-cultural, Technological, Legal and Environmental). By the end of the session, the participants were familiarized with the practice and application of ORE concepts they had learnt from the first session. The main take-aways the participants took from this session were the opportunities and challenges of ORE in Southeast Asia with the focus on the Philippines' socio-economic and political risks and opportunities.

SESSION 3: EXPERIENCES IN TIDAL ENERGY AND WAVE ENERGY PROJECT DEVELOPMENT

This session is presented by Dr. Ralf Starzmann, Sales Director, SCHOTTEL HYDRO. Session 3 talked about two types of tidal energy most often studied in Southeast Asia: a) tidal range and b) tidal stream. This session talked about the principles and operation of tidal range technologies, the global and regional tidal energy resources, the advantages and disadvantages of tidal range, tidal barrages and tidal lagoons. There was also a discussion about tidal range turbines and construction of tidal range projects. It also focuses on tidal stream technologies, its types, technology developers and actual tidal stream projects all over the world. The science behind each type was explained with corresponding actual projects. Challenges for each type of tidal energy technology were also discussed.

SESSION 4: ASSESSMENTS FOR ORE: RESOURCE, ENVIRONMENT, AND TECHNO-ECONOMICS

This session is presented by Mr. Michael Hook, General Manager, Sustainable Marine Energy Ltd. This session is divided into two sections – a) resource assessment of tidal energy and b) environmental impact assessment for ocean renewable energy. Session 4a looked into the in-depth about how wave and tidal resource are assessed, the science and engineering behind the both ocean energy technologies. The basics of tidal survey and wave resource assessment were also discussed as part of this subsection. For session 4b, a crucial aspect of ocean renewable energy assessment was discussed – the environmental impact assessment. The main take away the participants took from this session was that environment influences all aspects of ocean energy, from concept development, technology design, overall site selection, site layout options, implementation strategy, cost base and revenue streams to competition with other energy supplies. The discussion also focused on the specific environmental regional conditions in Southeast Asia.

SESSION 5: INVESTING ON OCEAN RENEWABLE ENERGY TECHNOLOGIES & PROJECTS

This session is presented by Dr. Michael Lochinvar Sim Abundo, Managing Director, OceanPixel Pte Ltd (Singapore). Session 5 elaborated on the costs, financing and risks for wave and tidal energy and investing on niche markets related to ocean energy. The session contained costs of wave and tidal energy technologies (with emphasis on the different markets of wave and tidal), cost reductions of the two, financing and the risks involved in investing in wave and tidal energy technologies. It also discussed about the other markets where ocean renewable energy can be utilized. Aside from on-grid applications, off-grid locations could also be a potential market. There are both benefits and disadvantages in investing in these niche markets which were addressed with various strategies and policy frameworks. Case studies in Southeast Asia were also discussed in this section.

GROUP ACTIVITY: SUMMARY & ANALYSIS

During Session 2 - Market Opportunities & Challenges of Ocean Renewable Energy in Southeast Asia, a group activity was organised for participants to apply what they have learned during the session using the the PESTLE analysis and ocean energy. This activity allowed the trainer to know the benchmark knowledge of the participants about ocean energy.



PESTLE Analysis for Ocean Renewable Energy in the Philippines:

POLITICAL

- The present administration is not supportive of renewable energy (RE).
- The policies of the past administration were not carried over to the present.
- Changes in the leadership in the Department of Energy (DOE).
- Many changes in the guideline issued by the DOE especially in the implementation of the RE Law.
- It is not clear if Feed-in-Tariff for ocean still stands since there was no cancellation for feed-in-tariff (FiT).
The NREB targets for capacity installation of ocean renewable energy is 36 MW by 2020, but no solid government program was in place for ocean renewable energy.

ECONOMIC

- Ocean renewable energy technologies are expensive, but recent prices of solar and wind have decreased, and ocean renewable energies can follow suit.
- The rate structure existing in the Philippines is not subsidized.
- Absence of funders to support the development of ocean renewable energy.
- Absence of Feed-in Tariff for Ocean renewable energy.
- Sharon of Energy Regulatory Commission (ERC): The FiT was not cancelled but otherwise deferred, since ocean renewable energy has no basis for FiT rate determination. The government cannot use the data from pilot studies for rate determination and passed on to consumers. The data that is used for to determine the FiT rate for ocean renewable energy was for an OTEC technology.
- Absence of benchmarking. We cannot benchmark our rates with the studies and ocean power projects in other countries.
- There is an additional cost in the transmission lines since ocean renewable energy are located offshore. The estimated cost of an AC submarine cable is 15 million pesos per km, with a 13.kVA line, that may be able to accommodate 10MW power transmission.

- Ocean energy has not reached grid parity.

SOCIAL

- The social acceptability of ocean renewable energy, especially to the employment opportunity it can give to the community.
- Decentralized and modular model of ocean renewable energy can bring economic and social benefits to the community.
- Ocean renewable energy might affect the livelihood in the community as it may block their fishing grounds.
- Social acceptability with regards to the price impacts of ocean renewable energy technologies to the consumer.

TECHNOLOGY

- Absence of pilot or demonstration projects to showcase the viability of these technologies.
- Much work is to be done to improve the technology. – technology is still not mature.
- There should be certification and standards with regards to the technology and the installers.
- There should be available aftersales services of the technology. Contracts should include its maintenance and operation, and eventually transfer of knowledge and the technology.
- The expected lifetime of the technology is not guaranteed, especially that it is submerged underwater and exposed to harsh environment, like corrosion and biofouling.
- The technology is tested and design in other countries.
- It is exposed to extreme weather conditions at sea, especially during typhoons.

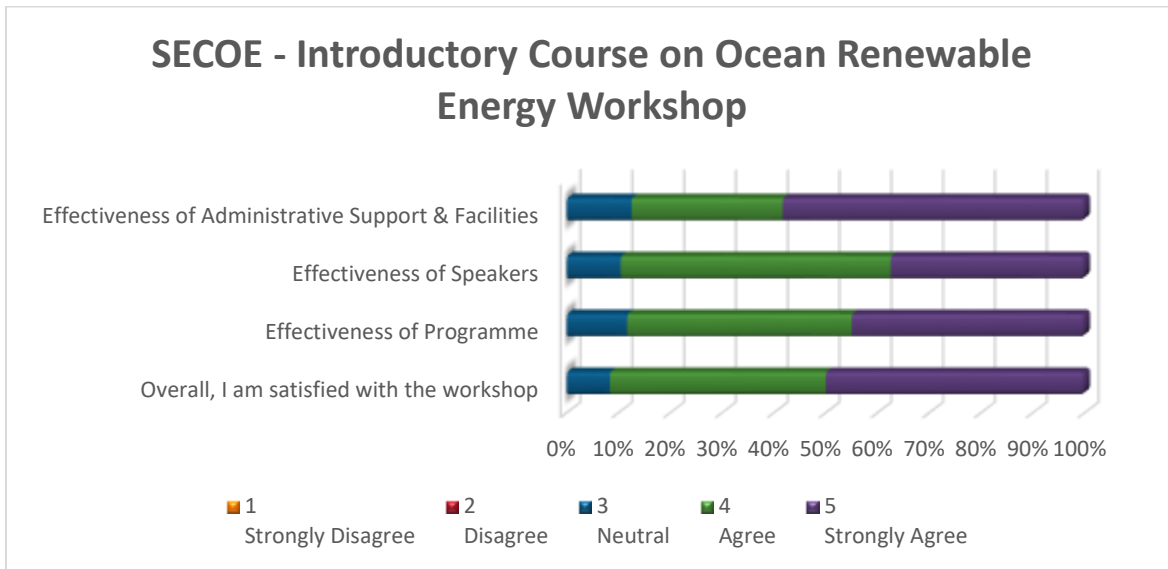
LEGAL

- Not all mechanisms are in place to help support the growth of ocean renewable energy.
- Opportunities in upcoming mechanisms in RE such as off-grid renewable portfolio standard (RPS) and UCME for RE. Presently, electric cooperatives are incentivized to explore other options for power generation through UCME2 and cash incentives, if they can make their power generation cheaper than the existing diesel power generation.
- ROMELCO has this existing grant to put up a mini-grid with all RE resources to study the impact of RE, technically and financially.

ENVIRONMENT

- There are environmental impacts of ocean renewable energy.
- The effects of ocean renewable energy to the environment is not understood and not well studied yet.

FEEDBACK



ANNEX 1: PROGRAMME

Introductory Course on Ocean Renewable Energy: New Entrants into the Southeast Asia Marine and Offshore Energy Market

Date: 7 June 2018

Venue: Pasig Room 14/F Lopez Building, Meralco Ortigas Center,
Pasig City, Philippines

8:15am – 9:00am	Registration
9:00am	Start of Workshop - Welcome Remarks by Ms Maria Vivien C. Arnobit from Meralco Power Academy & Ms Nor Azlyn Supingi from SEAS
9:15am – 10:15am	Session 1: Introduction to Ocean Renewable Energy (ORE) & the ORE Industry Dr. Martin Koh, Hydrodynamic Engineer, OceanPixel Pte Ltd (Singapore)
10:15am – 10:30am	Coffee Break
10:30am – 11:15am	Session 2: Market Opportunities & Challenges of Ocean Renewable Energy in Southeast Asia Ms. Marianne Eleanor A Catanyag, Program Manager, OceanPixel Pte Ltd
11.15am – 12:00pm	Session 3: Experiences in Tidal Energy and Wave Energy Project Development Dr.Ralf Starzmann, Sales Director, Schottel Hydro
12:00pm – 12:30pm	Q&A / Open Forum / Photo Session
12:30pm – 13:20pm	Lunch
13:30pm – 14:15pm	Session 4: Assessments for ORE: Resource, Environment, and Techno-Economics Mr. Michael Hook, General Manager, Sustainable Marine Energy Ltd
14:45pm – 15:00pm	Coffee Break
15:00pm – 15:30pm	Session 5: Investing on Ocean Renewable Energy Technologies & Projects Dr. Michael Lochinvar Sim Abundo, Managing Director, OceanPixel Pte Ltd (Singapore)
15:30pm – 16:00pm	Q&A / Open Forum
16:00pm – 16:15pm	End of Workshop - Closing Remarks by Ms Nor Azlyn Supingi from SEAS

ANNEX 2: LIST OF THE SPEAKERS AND PARTICIPANTS

A. LIST OF SPEAKERS

1. Dr Martin Koh, Hydrodynamic Engineer, OceanPixel Pte Ltd (Singapore)
2. Marianne Eleanor A Catanyag, Program Manager, OceanPixel Pte Ltd
3. Dr. Ralf Starzmann, Sales Director, SCHOTTEL HYDRO
4. Dr. Michael Lochinvar Sim Abundo, Managing Director, OceanPixel Pte Ltd (Singapore)
5. Michael Hook, General Manager, Sustainable Marine Energy Ltd

B. LIST OF PARTICIPANTS

NAME	ORGANIZATION	COUNTRY
Mr. Gregg Yan	Best Alternatives	Philippines
Mr. Criscel Galang	Department of Energy	Philippines
Ms. Elaine Diane Bonsol	Department of Energy	Philippines
Ms. Kristam Uy	Department of Energy	Philippines
Ms. Maria Teresa Mendoza-Marasigan	Elburg Shipmanagement Phils., Inc.	Philippines
Ms. Phelia Charisse San Juan	Energy Regulatory Commission	Philippines
Ms. Sharon Montaner	Energy Regulatory Commission	Philippines
Ms. Veronica Sapitin	Ishizaki Construction and Development Corp.	Philippines
Ms. Yolibel Mendoza-delos-Santos	Ishizaki Construction and Development Corp.	Philippines
Mr. Ephraim delos Santos	Ishizaki Construction and Development Corp.	Philippines
Mr. Eugene Araullo	Spectrum	Philippines
Mr. Ciprinilo C. Meneses	Meralco	Philippines
Ms. Jermaine A. Guela	Meralco	Philippines
Mr. John Macadangdang	Meralco	Philippines
Mr. Marlon P. Castillo	Meralco	Philippines
Mr. Nelyn Villania	Meralco	Philippines
Ms. Anna Maria Reodica	Meralco	Philippines
Ms. Stephane del Alamo	MGEN	Philippines
Mr. Rafael Nicolas Espinoza	Miescor Builders Inc.	Philippines
Mr. Wendel Mediarito	Miescor Builders Inc.	Philippines
Mr. Jesse Carlo Lustre	MBI	Philippines
Mr. Jayson Corpuz	National Electrification Administration	Philippines
Ms. Angela Consuelo Ibay	World Wide Fund for Nature (WWF) Philippines	Philippines
Ms. Vivien Arnobit	MPA	Philippines
Mr. Marc Malibiran	L&D	Philippines
Mr. Patrick Pondevida	SCHNEIDER	Philippines
Mr. Nelson Enano	AdDU- CREATE	Philippines
Mr. Weslie Capute	LIVES	Philippines