

CTCN Technical Assistance

*Pre-feasibility Study on Ocean Energy focusing on Salinity Gradient Energy Technology and
Electrochemical Ocean Thermal Energy Conversion in Papua New Guinea*

Inception Workshop Report

UN CTCN TA Inception Workshop – Papua New Guinea Mission

Workshop dates: 11–13 November 2024 | Port Moresby & Lae, Papua New Guinea

Implementer: **Korea Institute of Energy Research (KIER)** – Distributed Energy Team, Jeju Global
Research Center

In partnership with UNEP-CTCN, PNG-CCDA (NDE) and PNG-NEA

Submitted to: UNEP-CTCN

Response Plan reference: Output 2, Activity 2.2 (inception workshop).

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1. Workshop Overview

Project title: Pre-feasibility study on Ocean Energy focusing on Salinity Gradient Energy Technology and Electrochemical Ocean Thermal Energy Conversion.

Workshop title: UN CTCN TA Inception Workshop.

1.1 Overview

Date	11 November (Monday) to 13 November (Wednesday), 2024
Venue	Hilton Port Moresby Hotel (11–12 Nov) and field site visits near Lae, Morobe Province (13 Nov)
Participants	12 people (11 men, 1 woman), including: – Dr. Hanki Kim and Dr. Woonho Baek (KIER) – Mr. Hoyoung Jo (CTCN PALO) – Mr. Danny Nekitel, NDE of PNG and Manager at CCDA – Stakeholders and potential partners in PNG

1.2 Objectives

- Establishing a project steering committee
- Identifying and engaging key stakeholders
- Collecting project background data
- Project site selection
- Providing an update on CTCN activities and prospective opportunities

2. Day 1 – 11 November (Monday)

2.1 Quadrilateral Meeting for the UN CTCN TA Project

Participating organizations:

- Korea Institute of Energy Research (KIER)
- UNEP-CTCN (United Nations Environment Programme – Climate Technology Centre and Network)
- PNG-CCDA (Climate Change and Development Authority, Papua New Guinea)
- PNG-NEA (National Energy Authority, Papua New Guinea)

A total of four organizations participated.

Participants:

- **KIER:** Dr. Hanki Kim (Senior Researcher), Dr. Woonho Baek (Senior Administrator)
- **CCDA:** Danny Nekitel (Manager)
- **NEA:** Larsen Daboyan (Manager)
- **UNEP-CTCN:** Hoyoung Jo (Asia-Pacific Specialist)

Key discussion points:

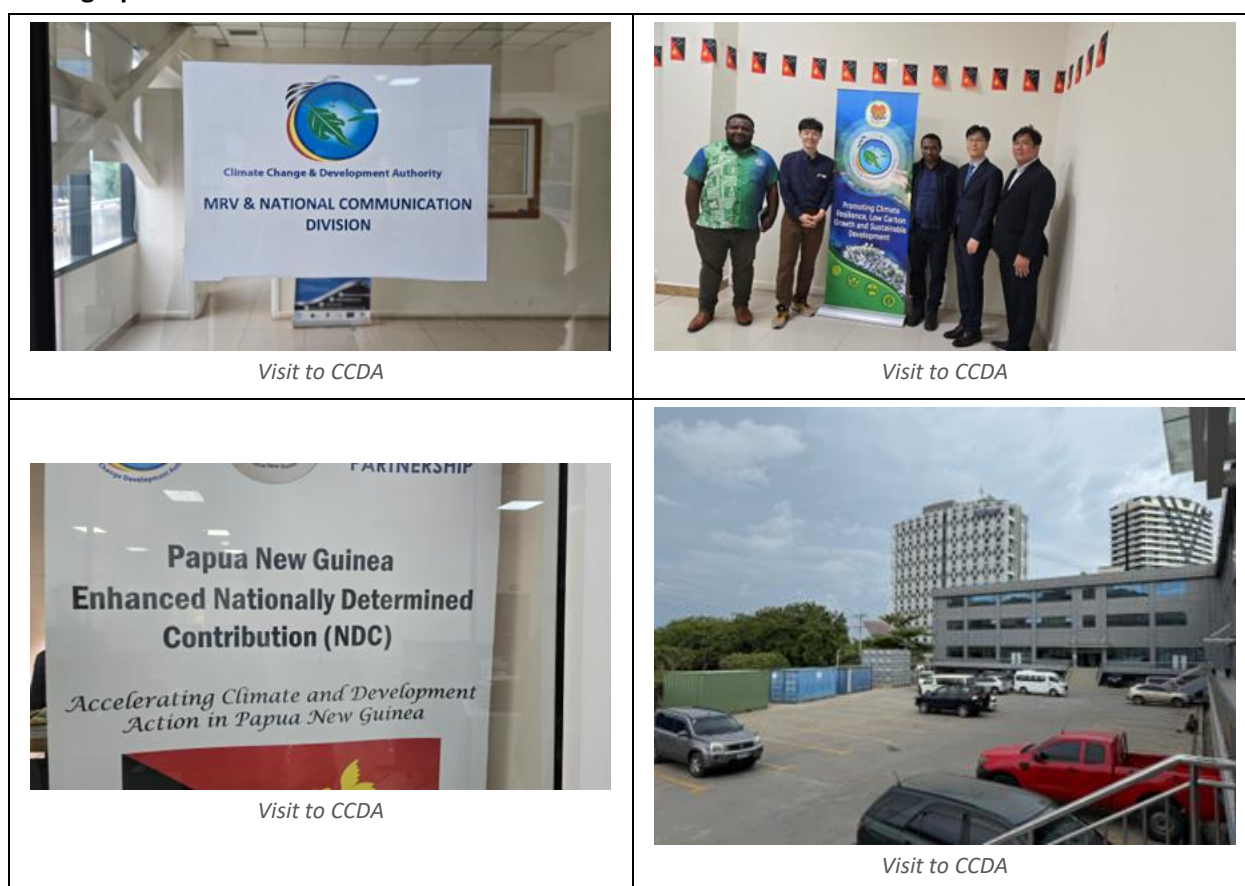
- Introduction to the Ocean Energy TA Project and its technologies

- Establishing the roles and responsibilities (R&R) of each participating organization

2.2 Visit to PNG CCDA Headquarters

Overview	Institutional visit upon invitation from Danny Nekitel (CCDA Manager)
Date & time	11 November (Monday), 14:00 – 15:00
Participants	Hoyoung Jo (UNEP-CTCN) Hanki Kim (KIER) Woonho Baek (KIER)
Discussion topics	Introduction to the roles and responsibilities of each CCDA department Strategies for successful implementation of the CTCN TA Project

Photographs – Visit to CCDA



3. Day 2 – 12 November (Tuesday)

3.1 UN CTCN TA Inception Workshop

Date & time: 12 November (Tuesday), 10:00–18:00

Venue: Hilton Hotel PNG, Conference Room

3.1.1 Program – Day 2

Time	Program	Lead
10:00–11:00	Introduction and updates on CTCN activities	Jo
11:00–12:00	Kick-off presentation: – TA plan during the project, final goal & products	Kim
12:00–13:00	Lunch at Hilton	
13:00–14:00	Overview of PNG	Nekitel
14:00–15:00	Introduction of KIER – including technologies related to the project	Baek & Kim
15:00–16:00	Identifying and engaging key stakeholders	Nekitel & Participants
16:00–17:00	Establishing a project steering committee	
17:00–18:00	Future working plan – Role and Responsibility, and Collaboration for TA	Committee

3.1.2 Participants List

#	Title	Name	Position	Org.	Gender
1	Mr.	Johnson Kilis	Senior Mitigation Officer	CCDA	M
2	Mr.	Danny Nekitel	Manager, Mitigation	CCDA	M
3	Prof.	Chalapan Kaluwin	HOD, Environmental Sciences	UPNG	M
4	Dr.	Reynold Philips	HOD, Chemistry	UPNG	M
5	Dr.	Peter Petsul	Lecturer, Environmental Sciences / Chemistry	UPNG	M
6	Mrs.	Emily Mulina-Pomoh	Mitigation Officer	CCDA	F
7	Mr.	Minando Baro	Mitigation Officer	CCDA	M
8	Mr.	Larsen Daboyan	Manager, Policy Planning & Research Division	NEA	M
9	Mr.	Ben Piu	Policy Officer	NEA	M
10	Mr.	Hoyoung Jo	Climate Technology Specialist	CTCN	M
11	Dr.	Woonho Baek	Senior Administrator, Global Strategy Team	KIER	M
12	Dr./Prof.	Hanki Kim	Senior Researcher, Chief of Distributed Energy Team / University of Science and Technology (UST)	KIER	M
			Total: 12 (11 men, 1 woman – 8%)		

3.2 Meeting Minutes

Papua New Guinea (PNG) aims to achieve its Nationally Determined Contribution (NDC) targets – carbon neutrality in the energy industries sub-sector and a 78% renewable share of grid-connected capacity by 2030 – through the use of renewable energy. However, the country faces challenges due to the relatively limited availability of renewable energy resources, such as wind and solar power, as well as an underdeveloped energy industry infrastructure, including Maintenance, Repair, and Overhaul (MRO) services.

PNG's Climate Change and Development Authority (CCDA) is making significant efforts to position ocean energy as a key competitive advantage in the carbon-neutral era. To achieve this, CCDA seeks to leverage Korea Institute of Energy Research (KIER)'s expertise in ocean energy research and development to enhance the country's science and technology-driven national growth strategy. Additionally, CCDA aims to strengthen its collaboration with KIER through the support of UNEP-CTCN.

PNG has a strong interest in Jeju Island's carbon-neutral vision, which aims to become an "Energy Island." The country hopes to adapt and implement the Jeju Global Research Center's vision and strategic initiatives to suit its own national context. Furthermore, PNG has expressed its desire to visit Jeju Island in 2025 to explore its carbon-neutral initiatives and energy strategies.

3.3 Photographs



Kick-off presentation



UN-CTCN presentation	PNG CCDA presentation
 Introduction of potential PNG local partners / PNG NEA	 Presentation of the introduction of KIER

4. Day 3 – 13 November (Wednesday)

4.1 Meeting with Local Prospective Partner (UNITECH)

Meeting venue	UNITECH, Lae City
Participant	Prof. Ora Renagi, Vice Chancellor of UNITECH
Discussion topics	Review of potential candidate sites for the CTCN TA project and collaboration on a capacity-building program

Meeting minutes:

UNITECH plans to launch an Energy Specialist Program starting in 2025 and expects a certain number of graduate students to enroll in the Energy Engineering graduate program. The UNITECH Physics Department aims to collaborate with KIER to develop a specialized curriculum in ocean energy, leveraging KIER's TA project on ocean energy. Additionally, UNITECH hopes to actively participate in expert training through personnel exchange with the Jeju Global Research Center (JGRC).

KIER-JGRC has extensive research and development experience in salinity gradient power generation and continues to expand its expertise in ocean energy storage and thermal energy conversion technologies. Through these advancements, KIER-JGRC is positioning itself as a leading global research group in the Water-Energy Nexus field. Furthermore, KIER-JGRC possesses the international capacity to provide technical demonstration support and training for countries in the Asia-Pacific region, including PNG, that require technological assistance.



Meeting with Vice Chancellor of UNITECH ①



Meeting with Vice Chancellor of UNITECH ③

4.2 Site Visit to Potential Project Locations

Candidate sites: Basu River and Markham River, PNG

- Water quantity and quality analysis will be conducted using specialized equipment at a later stage.
- If on-site analysis is required, UNITECH has agreed to provide active support for the process.

Basu River site visit



Basu River ① – accompanied by a local (UNITECH) guide due to safety concerns



Basu River ②



Basu River ③ – rapid water flow with high sediment content from soil runoff



Basu River ④ – challenging, remote access without electricity or water infrastructure

Markham River site visit



Markham River ① – accompanied by a local (UNITECH) guide due to safety concerns



Markham River ②

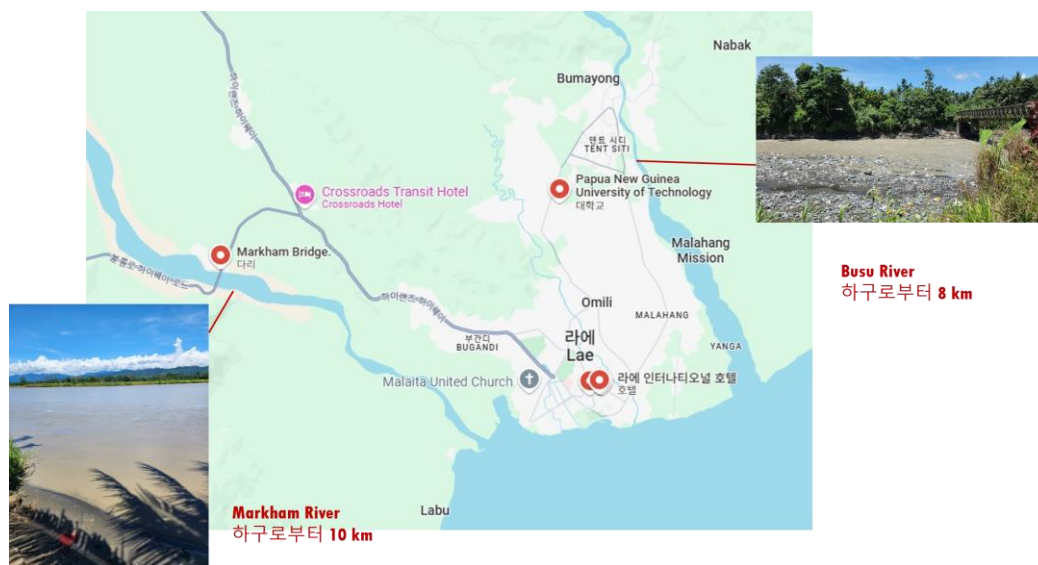


Markham River ③ / ④

Subsequent decision. Because of the access, safety, and sediment conditions observed, the Basu and Markham sites were not retained. The assessment moved to the Central Province coast near Port Moresby, where a site visit to Kalo took place in May 2025, and the CCDA Technical Review (April 2026) later identified the Kemabolo–Hula coastline as the optimal zone (see pre-feasibility study, Sections 3.2 and 3.4). The Markham gauge (Road Bridge, 1958–1976) has no usable flow data.

4.3 Geographical Location of Project Candidate Sites

- Basu River bridge: approximately 10 km from the river mouth (Google Maps)
- Markham River bridge: approximately 8 km from the river mouth (Google Maps)



Geographical location of candidate sites

5. Key Insights

- Papua New Guinea (PNG) is exploring strategies to overcome the carbon-neutrality challenges faced by Pacific nations while fostering the energy sector as a new driving force for national growth. PNG seeks active collaboration with Korea (KIER) through the UN CTCN project.
- The initially identified demonstration sites present challenges for ocean energy implementation. However, a phased and multidimensional strategy is required, considering additional site evaluations, feasibility studies, and collaborative research.

6. Follow-up Actions

- By mid-February, a CTCN Steering Committee will be established, and an online meeting will be scheduled. Status at TA closure: Done – PSC established at the 1st PSC meeting (online), 19 February 2025.
- A follow-up visit to PNG is planned for March. Status at TA closure: Done, later than planned – in-country mission held 25–30 May 2025 (in-person PSC, Kalo site visit, lab-scale RED installation at UPNG, young professionals workshop).
- PNG visit to Jeju (Section 3.2). Status at TA closure: Done – Korea wrap-up program, 8–13 March 2026.
- Water quantity and quality analysis at the candidate sites (Section 4.2). Status at TA closure: Not carried out at Basu/Markham; single-day sampling at Kalo (27 May 2025).