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April 2022 –
March 2023

Annual Report



Prepared by: NZMATES PMO

Prepared for: NZ MFAT

April 2022 – March 2023

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Figure 1: NZMATES Senior Stakeholder Engagement and Partnerships Officer Vivi Toumahuw and RE Technical Specialist Usep Nuraen explain the features of the Pūngao Pattimura Mini-Grid Training Lab.

LIST OF ACRONYMS

ADB	Asian Development Bank
AFD	Agence Francais de Developpement (French Development Agency)
APBN	Anggaran Pendapatan dan Belanja Negara (State Budget)
Bappeda	Badan Perencanaan Pembangunan Daerah (Maluku Development Planning Board)
Basarnas	Badan Nasional Pencarian dan Pertolongan (National Search and Rescue Agency)
BLK	Balai Latihan Kerja (Vocational Training Centre)
BPS	Badan Pusat Statistik (Maluku Statistics Board)
BRIN	Badan Riset dan Inovasi Nasional (National Research and Innovation Agency)
CIP	Climate Investment Platform
DAK	Dana Alokasi Khusus (Special Allocation Funding)
DJ EBTKE	Direktorat Jenderal Energi Baru Terbarukan dan Konservasi Energi (Directorate General for New and Renewable Energy and Energy Conservation)
Dinas ESDM	Dinas Energi dan Sumber Daya Mineral (Energy and Mineral Resources Agency)
EBT	Energi Baru dan Terbarukan (New and Renewable Energy)
FGD	Focus group discussion
FOP	Forward Operating Plan
FS	Feasibility study
GCF	Green Climate Fund
HSS	Health, Safety and Security
IPP	Independent Power Producer
IRENA	International Renewable Energy Agency
LEAP	Low Emissions Analysis Platform
LisDes	Listrik Desa (Village Electrification)
LOP	Life of Programme
MEL	Monitoring, Evaluation and Learning
MFAT	Ministry of Foreign Affairs and Trade
MLIN	Maluku Lumbung Ikan Nasional (Maluku National Fish Barn)
MMU	Maluku dan Maluku Utara (Maluku and North Maluku Provinces)
NZMATES	New Zealand – Maluku Access to Renewable Energy Support
O&M	Operation and maintenance
PA	Project Agreement
PLN	Perusahaan Listrik Negara (National Electricity Company)
PLTS	Pembangkit listrik tenaga surya (solar power plant)
PM	Programme Manager
PMO	Programme Management Office
PSG	Programme Steering Group
RE	Renewable Energy
Renstra	Rencana Strategis (Strategic Plan)
RETS	Renewable energy technical specialist
RPJMD	Rencana Pembangunan Jangka Menengah Daerah (Medium-Term Regional Development Plan)
RUED	Rencana Umum Energi Daerah (General Provincial Energy Plan)
SMK	Sekolah Menengah Kejuruan (Vocational High School)
TC	Technical Committee
UP3	Unit Pelaksana Pelayanan Pelanggan (Customer Service Delivery Unit)
VUW	Victoria University of Wellington
YMCI	Yayasan Mercy Corps Indonesia

EXECUTIVE SUMMARY

This annual report corresponds to the fifth year of implementation of the NZMATES programme, from 1st April 2022 to 31st March 2023. During this period activities accelerated significantly compared to previous years, as COVID-19 pandemic restrictions were gradually lifted.

The overarching goal of the NZMATES programme is to support the uptake of affordable, reliable and renewable energy in Maluku Province, and significant progress was made towards this goal in 2022-2023. Pipeline activities gathered pace and many of the sites previously assessed in pre-FS finally began to progress towards funding and implementation. A major milestone is that PLN has confirmed funding for 17 hybrid PLTS sites in Maluku (previously assessed by NZMATES in pre-FS desk studies), and there is a steady pipeline of further projects likely to progress to funding and implementation in the coming year. Alongside this, training and mentoring activities have continued to expand, and some key projects have been completed. These include NZMATES support to Maluku's General Energy Plan (RUED), which was officially signed into law by the Governor of Maluku, and the Pūngao Pattimura Mini-Grid Training Lab, which was inaugurated in July 2022 and hosted two pilot trainings.

All these activities made for a busy year during which significant progress was made. The approval of an extension of the NZMATES programme until 2024 means that, , the NZMATES team are now in their final year of implementation, and expect to be even more busy in the months to come!

Section 1 of this report provides an overview of progress towards the achievement of outputs, short-term outcomes and medium-term outcomes, including some positive progress towards funding and implementation of pipeline projects. Section 2 looks at the progress of tasks against the workplans provided in FOP 9 and FOP 10. Section 3 provides a summary of findings from a 'Stories for Change' study, conducted to gather qualitative data on changes occurring as a result of NZMATES support. The study confirms that the three change pathways in the NZMATES results framework are in fact occurring as expected, with progress in the project pipeline pathway slower than changes in enabling environment and capacity building areas. Section 4 provides insight into how NZMATES has addressed the cross-cutting issues of human rights, gender and environment in the past year. Section 5 contains a summary of lessons learned from the year's activities and the responses and recommendations resulting from these. Section 6 covers a summary of risks that have changed over the past year, while Section 7 looks at next steps for the coming year. Finally Section 8 provides an overview of budget and expenditure for the reporting period, showing that the Discretionary Budget continues to be the main area of under spend, which will need to be accelerated in the coming year.



Figure 2: NZMATES team and MFAT delegation during a visit to Ambon February 2023

1 KEY ACHIEVEMENTS AND PROGRESS

1.1 Results framework

NZMATES’ annual results framework review was delayed due to the resignation of the MEL & Reporting Specialist at the time the review would usually have taken place. This means no changes have been made to the results framework since the last annual report.

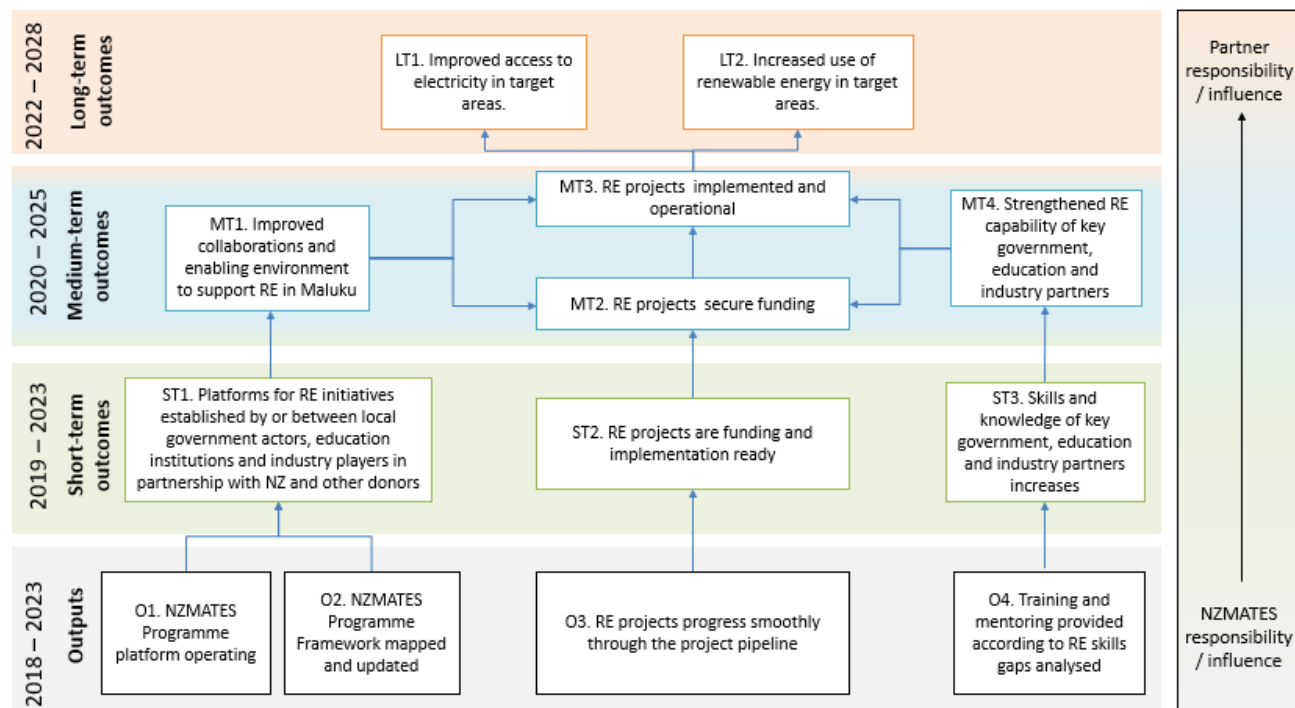


Figure 3: Current version of NZMATES results framework

1.2 Delivery of Outputs

Output 1: Programme Platform Operating

The following sections summarise progress in the key sub-areas of Output 1.

Programme Management Office

No.	Indicator	Year 1	Year 2	Year 3	Year 4	Year 5	LOP ¹ target
O1.1	Qualified PMO team in place	Yes	Yes	Yes	Yes	Yes	Yes
O1.2	PMO has sound, relevant procedures and policies in place, approved by Programme Manager and updated annually.	Yes	Yes	Yes	Yes	Yes	Yes

¹ Life of Programme target – target for end of NZMATES programme in June 2024

This year saw the removal of all Government of Indonesia (GOI) covid activity restrictions, and the NZMATES team were able to settle into a hybrid working rhythm, with each team member working 4 days from the office and 1 day from home per week. While some team members were affected by covid illness, disruption to programme activities has greatly reduced. All team members are vaccinated and have been able to recover fully from covid infections.

New Zealand personnel were also finally able to travel to Indonesia. Programme Advisor Kitty Garden travelled twice to Ambon, in June 2022 and in February 2023, and Engineer Mansoor Shah was able to visit in March 2023 to conduct training activities with PLN and the NZMATES team.



Figure 4: NZMATES Field coordinator practicing remote navigation techniques during the Basarnas training.

However, even with the receding pandemic, health and safety continued to be a focus for the team, with a focus on field travel safety, as the team's field activities accelerated. First aid refresher training was provided to all team members, and those traveling frequently to the field were provided with training in remote navigation and boat engine repair from Indonesia's Basarnas (*Badan Nasional Pencarian dan Pertolongan*, National Search and Rescue Agency).

There were several important staff changes in NZMATES during the last year. In August 2022 Technical Manager Nicholas Simanjuntak chose not to extend his contract with NZMATES for personal reasons. New Technical Manager Vasco Tangkulung joined the team in the last week of September, coming from a role as International Solar PV Expert at the United Nations Development Programme in Dili, East Timor. Pak Vasco is based in Jakarta but travels to Ambon frequently. A new two-bedroom guest house was rented close to the NZMATES office, for use by Pak Vasco and other visitors to the programme. This has already led to significant savings in accommodation costs.

Senior Communications Officer Frida Rahmita Gultom also ended her contract in September 2022, and was replaced by Wean Upadhi in December 2022. Wean brings experience in journalism and photojournalism as well as communications and media strategy from the non-profit sector.

RE Technical Specialist Slamet Andri Murtopo also decided not to extend his contract and finished with NZMATES in October 2022. New RETS Yayan Suryana joined the NZMATES team in November 2022. Yayan brings significant hydropower and civil engineering expertise from working with IPP companies.

Finally, MEL and Reporting Specialist Dintani Naimah resigned in January 2023, and was replaced by Grace Nasya Masela, who is due to join the NZMATES team in April 2023. Nasya is originally from Ambon, though she grew up outside Maluku. She has been working in MEL and programme management roles in Wahana Visi in Sulawesi for many years.

Monitoring, Evaluation and Learning (MEL)

No.	Indicator	Year 1	Year 2	Year 3	Year 4	Year 5	LOP target
01.3	Results framework reviewed annually and endorsed by PSG.	Partial	Yes	Yes	Yes	Yes	Yes

Regular MEL activities continued as usual during the reporting period, with indicators updated regularly, mini-reflection meetings held with the NZMATES team monthly and more comprehensive reflection workshops held six-monthly.

The second annual reflection with partners process was conducted from March until May 2022. This followed the same format as previously, with an online questionnaire distributed to partners and followed up with focus group discussions (FGDs), which were mostly held online.

In general, all respondents appreciated NZMATES support and activities, both in technical assistance and capacity building. Partners at provincial level also expressed satisfaction with NZMATES’ Technical Committee as a multi-stakeholder platform to discuss renewable energy development in Maluku.

All respondents agreed that technical assistance and training activities are making a very big contribution towards renewable energy implementation in Maluku. For instance, PLN with its new approach using SAM and HOMER software, Dinas ESDM feels supported with RUED assistance, and BAPPEDA feels supported with coordination among energy-related stakeholders. Partners also mentioned that other activities, such as mentoring, funding search, and developing guidelines, are also contributing to renewable energy implementation as shown in Figure 5.

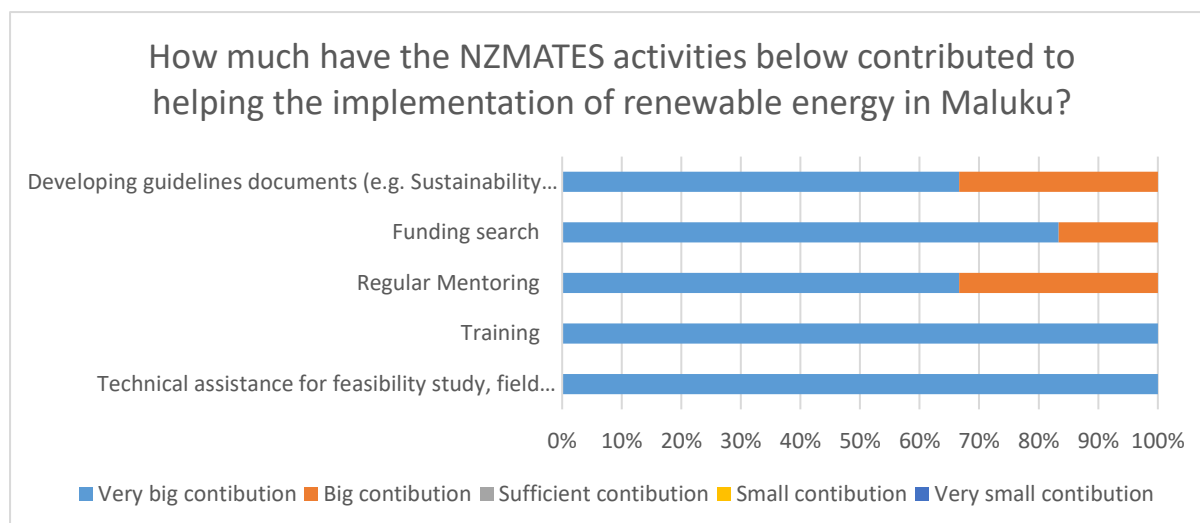


Figure 5. Partners’ scoring on NZMATES activities related to its contribution to renewable energy implementation in Maluku

NZMATES activities have also contributed to institutional capacity development. Most partners expressed that technical assistance and training have made a very big contribution in improving the capacity of their institution. Contribution of other activities is visualized on Figure 6.

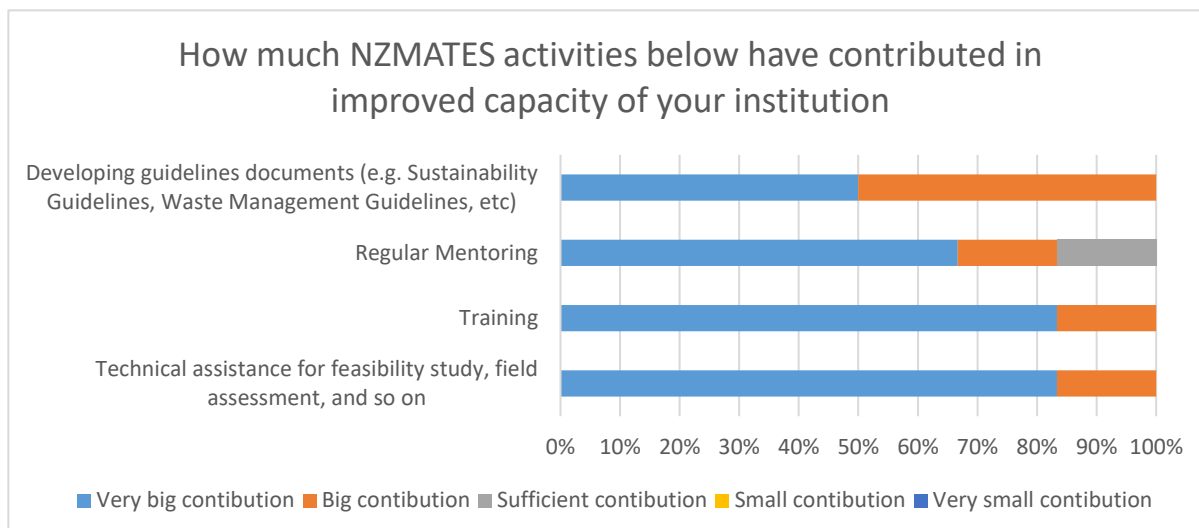


Figure 6. NZMATES Contribution to Partners’ Institutional Capacity

A third annual reflection with partners process was to be conducted in early 2023, however this was cancelled due to other similar activities requiring partner input occurring around the same time – namely the special study on Stories of Change, conducted by CIRCLE consultants and concluded in late 2022, and the independent evaluation to be contracted by MFAT in early 2023.

Under the Stories of Change study, the consultants interviewed several key NZMATES partners and identified what kinds of changes are occurring and the extent to which NZMATES support has contributed to these. The study also analysed to what extent changes are in line with NZMATES MEL targets and expectations, and provided recommendations for improving outcomes. A more detailed summary of the results of the study is provided in section 3.



Figure 7: focus group discussion with women on Pulau Tiga as part of NZMATES socio-economic baseline

A socio-economic baseline study was also conducted in the community of Nusa Ela on Pulau Tiga, ahead of the kick-off of implementation of the solar mini-grid refurbishment project there. The NZMATES MEL & Reporting Specialist, Senior Community Engagement Officers and a team of enumerators conducted household surveys and focus group discussions on the island to examine the quality of electricity access, and social and economic conditions more broadly. While Nusa Ela had previously been surveyed during the NZMATES programme baseline study in 2019, it was decided that a new survey was needed to

account for possible changes due to the COVID pandemic. While the finalisation of the report was delayed due to the resignation of the MEL&R Specialist, the data has been gathered and analysed, and comparative data will be collected after the completion of the refurbishment to identify any changes.

The annual review of the NZMATES results framework and indicators was also postponed due to the resignation of the MEL&R Specialist, however it is now underway and any proposed updates will be shared at the next PSG meeting in June 2023.

Stakeholder Engagement and Programme Governance

No.	Indicator	Year 1	Year 2	Year 3	Year 4	Year 5	LOP target
01.4	Number of PSG meetings that are well-attended and produce clear outcomes.	0	2	3	5	7	9
01.5	Number of TC meetings that are well-attended and produce clear outcomes.	1	3	4	6	8	9

NZMATES conducted its 6th Programme Steering Group (PSG) meeting in May 2022 hosted at the New Zealand Embassy in Jakarta, the first time the meeting was held in-person since before the pandemic. The 8th TC meeting was also held in-person in September 2022, followed by the 7th PSG meeting in December 2022. The 9th TC meeting and 8th PSG meeting have been postponed at partners' request and will be held in May/June 2023.



Figure 8: In-person attendees at the 6th PSG meeting, hosted at the NZ

The extension of the NZMATES programme until June 2024 was officially approved by MFAT in August 2022, allowing one additional year to meet programme objectives, compensating for the slow-down of some activities due to the COVID pandemic. At the time of writing this report the Partnership Arrangement between MFAT, PLN and EBTKE has not yet been extended, however a draft amendment is under discussion.

There were several major changes at partner institutions during the reporting period, including:

- New Planning Manager at PLN MMU, Pak Khoirul Sani
- New Head of Dinas ESDM, Pak Abdul Haris
- PLN restructure at the national level, which saw the regional divisions disbanded, including the Sulawesi, Maluku, Papua and Nusa Tenggara (Sulmapana) Division. The former Executive Vice President of Planning for the Sulmapana Division, Pak Eman Priyono Wasito Adi, retired in early 2023 and thus NZMATES has been working with the New Zealand Embassy to engage with the new Director of Distribution, Pak Adi Priyatno.

NZMATES is also working with Dinas ESDM and BAPPEDA on refining the scope of the proposed Maluku Energy Stakeholder Forum, which is intended to support ongoing coordination and communication

between the various actors in Maluku’s energy sector once the NZMATES programme ends and the Technical Committee can no longer fulfil this function. Discussions currently revolve around identifying a suitable host institution for the Forum that can sustain the budget going forward.

Finally, NZMATES received a visit from MFAT Divisional Manager for Global Development and Scholarships, Joanna Kempkers, together with a delegation from the NZ Embassy in Jakarta and BAPPENAS, in February 2023. The delegates met with NZMATES partners and visited the Pūngao Pattimura Mini-Grid Training Lab, held a dinner with NZ scholarships alumni, visited another MFAT-funded project in Ambon, and paid their respects at the graves of New Zealand soldiers at the Commonwealth War Cemetery.



Figure 9: Joanna Kempkers speaks to NZ alumni and NZMATES team members in Ambon in February 2023.

Output 2: Programme Framework Mapped and In Use

No.	Indicator	Year 1	Year 2	Year 3	Year 4	Year 5	LOP target
02.1	Institutional framework mapping updated annually and approved by PM.	Partial	Yes	Yes	Yes	Yes	Yes
02.2	Technical framework analysis updated annually and approved by PM.	Partial	Yes	Yes	Yes	Yes	Yes
02.3	Financing, funding and grants catalogue updated annually and approved by PM.	Partial	Yes	Yes	Yes	Yes	Yes

A key milestone here was the signing of the regulation for Maluku’s RUED by the Governor of Maluku, and the final dissemination event held to inform provincial stakeholders of the new RUED and its implication for RE development in the province. The event was well-attended and received good media coverage, and NZMATES is continuing to work with Dinas ESDM and the Provincial government on next steps for the implementation of the RUED.

In addition, the NZMATES team continued to work to keep framework deliverables and data up to date, including gathering information on the latest plans from partners, and details on the latest technologies that could be applicable in Maluku RE projects.

Finally, as a follow-up to the Women in Energy initiative conducted in 2021, NZMATES has hired a team of consultants to conduct a Study on Barriers and Opportunities for Gender Participation in the Energy Sector in Maluku. At the time of writing this report, the consultants have completed field data collection activities and presented preliminary findings to NZMATES. Conclusion of the study is pending final analysis and completion of the final report including recommendations. A summary of key preliminary findings can be found in Section 4.2.



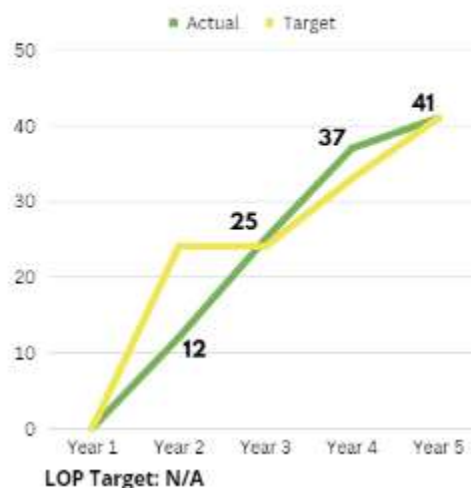
Figure 10: Gender study consultant conducts an FGD with women in the village of Gogorea.

Output 3: RE projects progress smoothly through the project pipeline

03.1 Number of RE projects in the NZMATES pipeline that have made progress towards funding.



03.2 Number of RE project documents made to support the progress of RE projects through the NZMATES pipeline with partner approval



While the number of new projects entering the NZMATES pipeline slowed compared to previous years, pipeline activities continued to be the main focus of NZMATES work, and significant progress was made on many projects. This can be seen in the indicator data, where only 5 new projects were appraised (O3.3), and 13 new projects made progress towards funding (O3.1). Only 4 new reports or documents were submitted to partners (O3.2), as NZMATES' approach focuses more on mentoring and supporting partners to produce reports of their own. Key projects worked on this year are noted below:

03.3 Number of RE projects or initiatives appraised for potential inclusion in the pipeline*)



- Pūngao Pattimura Mini-grid Training Lab
 - Inauguration held in July 2022, with attendance from Pattimura University Rector, PLN Pusat and PLN MMU, Dinas ESDM, Bappeda and representatives from other educational institutions in Ambon.
- Pulau Tiga PLTS refurbishment
 - Project Agreement signed with PLN in May 2022
 - Tender announcement published in July 2022 and four proposals received.
 - After a lengthy technical evaluation process and negotiation with the preferred vendor, NZMATES is ready to announce the winning vendor in May 2023, and for construction to start shortly thereafter.
- Bula 3MW PLTS IPP project
 - Feasibility study reviewed under alternative scenarios to increase the project's feasibility. Analysis found that even with reduced capacity or later implementation date project is not commercially attractive. Report submitted to PLN October 2022.
- PLTS Decommissioning and Waste Management Protocols and Guidelines

- Updated based on technical input from provincial authorities. Dissemination event held with Regency-level authorities in October 2022.
- Feasibility studies for four PLTS locations to support fisheries
 - FS prepared by NZMATES and Dinas ESDM Maluku and submitted for funding to Dana Alokasi Khusus (DAK) in April 2022. While it was then announced that the DAK funding itself would be allocated only for projects in Nusa Tenggara, two of the Dinas ESDM-NZMATES DAK sites were then selected for APBN funding by EBTKE in early 2023.
 - Next steps for implementation to be determined together with Dinas ESDM and EBTKE.
- PLN Hybrid PLTS Tayando Yamtel
 - Site visit conducted in conjunction with PLN, FS and detailed financial and operational studies completed and submitted to PLN.



Figure 11: 17.2kWp PLTS installed at the Health Centre in the community of Dullah Laut.

- PLN Listrik Desa (Village Electrification, LisDes) hybrid PLTS programme

PLN has allocated budget for the hybridisation of 27 diesel mini-grids with PLTS (17 in Maluku and 10 in North Maluku) in 2023. These were sites previously examined in group desk-study pre-FS conducted during the pandemic. NZMATES has visited 6 of these sites and is providing different kinds of support to PLN MMU to get them ready for implementation.

 - Training provided to PLN MMU and UP3 on site visit and FS preparation, focusing on site data gathering using measurement equipment and technical and socio-economic survey forms.
 - Rhun, Ai and Hatta: Site visit conducted in conjunction with PLN. Draft FS completed, finalisation of reports in progress.
 - Dullah Laut and Tonujaya: Site visit conducted to provide mentoring to PLN in the survey data gathering techniques covered in the training workshop. FS to be completed by PLN MMU with support from NZMATES.

- Tayando Langgiar: Site visit conducted in conjunction with PLN. Awaiting installation of new diesel generator to finalise FS.
- Other sites – pending site visit: Ollong, Guli-guli, Teor, Warbal, Ur, Tanimbar Kei, Rerean, Adodomolo, Makatian, Matakus, Wewawan
- PLN refurbishment programme
 - PLN has indicated budget is available for refurbishing 8 broken PLTS in Maluku (and one in Maluku Utara).
 - Banda Neira surveyed by NZMATES and PLN MMU together in November 2022. Draft FS completed, various alternative refurbishment scenarios discussed with PLN MMU, final FS and recommendations to be submitted in May 2023.
 - Kur, Elat, Panjang (Wisalean), Manwoko (Amarsekaru), Tahalupu, Wetar (Ilwaki) and Kisar (Wonreli) previously surveyed and FS prepared in 2019/2020 – need updating with latest data and remodelling refurbishment options.
 - Teor pending site visit.
 - Discussions ongoing with PLN MMU Generation Division on next steps and NZMATES support needed.
- PLN diesel replacement programme
 - At the national level PLN launched procurement for its diesel replacement programme, seeking IPP investors to build groups of hybridised PLTS throughout Indonesia. However the procurement process did not generate as much interest as hoped, and the programme has been paused for now.
- GCF Concept Note on financing framework for RE in remote islands
 - Submitted to GCF Board by PT SMI for feedback, including pipeline of NZMATES-PLN locations.
 - GCF Board feedback was positive overall, some additional information requested.
 - GGGI and PT SMI are working on refining the concept note, and the scope has been increased from USD \$50M to USD \$250M, as PT SMI's GCF accreditation has been increased.
- EBTKE rooftop implementation and sustainability support
 - Installation is complete and NZMATES has supported Dinas ESDM and the EPC contractor in troubleshooting several issues that arose. The two sites are currently pending final commissioning.
- EBTKE PLTS refurbishments
 - Two sites previously assessed by NZMATES for refurbishment and transfer to PLN in collaboration with ADB were directly refurbished by EBTKE (Watmasa and Lelingluan) – NZMATES is liaising with EBTKE to provide sustainability support, as the current ownership and management model is at very high risk of failure.
- Other projects that NZMATES worked on during the past year include:
 - O&M Platform implementation saw further delays with PLN restructure, requiring closer re-engagement with PLN. A workshop on O&M and asset management was held in March 2023 and the PA is expected to be finalised in June 2023.
 - IRENA CIP funding proposal – NZMATES attended IRENA match-making event, and there was some interest in the proposals. However this has now been placed on hold as PLN has requested to focus on LisDes and refurbishment projects for now, and because NZMATES is in its last year of implementation we are unlikely to be able to support this activity through to completion.

Output 4: Training and mentoring provided according to RE skills gaps identified

O4.1 Number of people who receive training and/or mentoring through NZMATES



O4.2 Number of training activities conducted aligned with identified skill gaps



NZMATES training and mentoring activities continued at pace during the programme’s fifth year, with both key partners PLN and Dinas ESDM, as well as educational institutions and other stakeholders such as operators from local government institutions. In total 10 training activities were conducted (O4.2) and 136 new people were reached by these activities (O4.1).

NZMATES delivered several pilot trainings at the Pūngao Pattimura Mini-grid Training Lab in 2022. The first was a Health and Safety training for operators of Dinas PLTS rooftop systems and UNPATTI solar lab, delivered by PPSDM KEBTKE trainers in May 2022. In July 2022, as part of the lab inauguration, a training on Operation and Maintenance (O&M) was delivered for the same target participants. Due to rainy weather conditions at the time, the hands-on component of the training was postponed, and was delivered in October 2022.



Figure 12: H&S training delivered by PPSDM KEBTKE trainers at Pūngao Pattimura Mini-Grd Training Lab

NZMATES also delivered several trainings on the preparation of RE feasibility studies, including the use of key software packages like PVSyst and HOMER, and field data gathering tools and techniques.

The first was an introductory training to Dinas ESDM on the basic use of PVSyst and HOMER in RE feasibility studies, delivered in August 2022.

Following this, also in August, was a collaboration with the UK MENTARI programme to deliver training on HOMER use for hybrid FS to PLN staff from throughout Eastern Indonesia, including Maluku. NZMATES Technical Team shared lessons learned from previous studies in Maluku, and mentored the Maluku participants in use of the software. FS conducted previously by NZMATES and PLN MMU were used as examples of good practice during this training and have been shared with other regional PLN offices. The purpose of this training was to equip PLN with the skills necessary to prepare the FS required for the second phase of the national Diesel Replacement Programme (DRP).

Following this, in September 2022, NZMATES delivered an advanced HOMER training to a wider group of participants in PLN MMU and UP3 offices in Maluku.

Finally, in January 2023 NZMATES delivered another training to PLN MMU and UP3 offices, this time focused on field data gathering techniques and tools, to equip PLN staff to prepare the FS for 27 sites allocated funding in 2023 under the LisDes solar hybridisation programme. Participants were introduced to measurement equipment, as well as forms, questionnaires and approaches to interviewing key stakeholders on site. The NZMATES team has since accompanied PLN on visits to several of the LisDes sites to mentor them in the use of these techniques.

In terms of support for educational institutions, between April and June 2022, NZMATES team also delivered introductory RE training sessions to students at several vocational high schools in Ambon, and also to Electrical and Mechanical Engineering students at Ambon State Polytechnic (PNA). Training in basic solar PV design was also delivered to vocational high school teachers in preparation for the opening of a Renewable Energy Major programme at SMK 4, however unfortunately permission to open the programme was denied by the Provincial Education Ministry, who have put a moratorium on opening new programmes due to concerns about capacity to deliver.

NZMATES also kicked off the Discretionary Budget project for Curriculum Development and Training of Trainers for Pattimura University (UNPATTI) and the Pūngao Pattimura Mini-Grid Training Lab. The team of consultants, a consortium between Alva Energi and Universitas Prasetya Mulya, visited Ambon in September 2022 and met with a variety of stakeholders in the education, training and RE sectors in Maluku and developed a detailed Needs Assessment report. They then developed a draft curriculum for a course focused on solar PV design, which has been submitted to UNPATTI for review. The finalisation of the consultancy has been delayed due to internal discussions in UNPATTI about the best fit for the solar training course within the Faculty's structure.

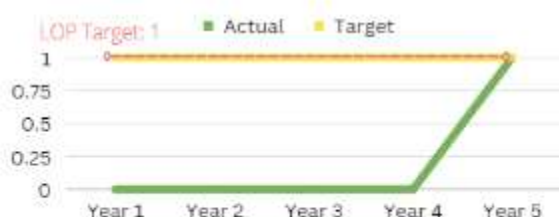
A collaboration was also set up between UNPATTI, NZMATES, Indonesia's National Research and Innovation Agency (BRIN) and Victoria University of Wellington (VUW), to conduct research into tidal current energy potential in two locations, in Saparua and Tual. Co-funded by VUW and NZMATES (through the Discretionary Budget), the project involved two VUW students traveling to Ambon to spend time gathering data in the field with UNPATTI, NZMATES and BRIN, which was then used to analyse the potential theoretical and practical capacity at the sites, as well as which types of technology would be best suited to the conditions. These preliminary results show the Saparua site has a technical potential of 11.4 MW, translating into a practical potential of approximately 2.9 MW. The Archimedes Screw was identified as the most appropriate technology type, due to its low environmental impact and low maintenance needs. At the time of writing this report, final analysis of the Tual results is still ongoing and the final seminar is due to be held in late May 2023.



Figure 13: UNPATTI student Ericson Tahalele takes wind speed measurements at the Tual tidal current research site.

This collaboration led to the signing of an MoU between UNPATTI and VUW, paving the way for further collaborations in the future. This represents the achievement of the programme target for indicator O4.3 as shown in the graph below.

O4.3 Number of training arrangements established between Indonesian and NZ universities or other educational institutions



Collaboration with the Swiss RESD programme continued, and staff from both UNPATTI and PNA attended various training of trainer activities, including courses on solar PV, micro hydro, SCADA systems, batteries, solar-diesel hybrid systems, teaching methodologies and RE standards and regulations. One of the PNA lecturers involved was then asked to work with Ambon’s Vocational Training Centre (Balai Latihan Kerja, BLK) to support the development of their own solar training curriculum, and the first batch of trainees have since graduated from

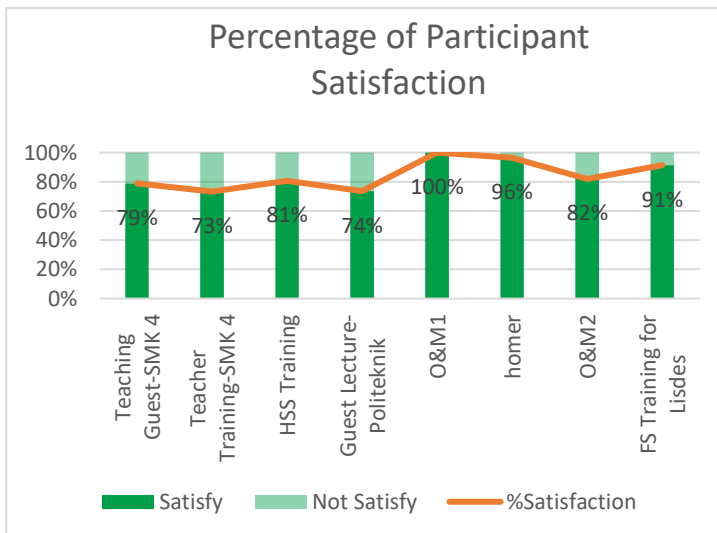
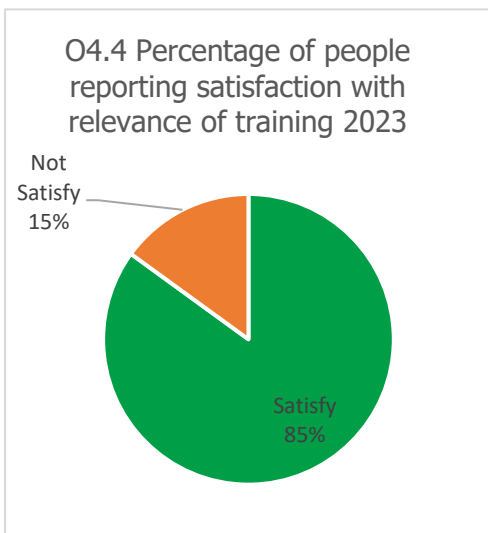
the BLK course with basic installation and maintenance skills.

Finally, in March 2023 New Zealand Engineer Mansoor Shah travelled to Ambon and delivered training workshops on RE Project Lifecycle Costs, O&M and Asset Management to PLN MMU’s Planning and Generation Divisions.



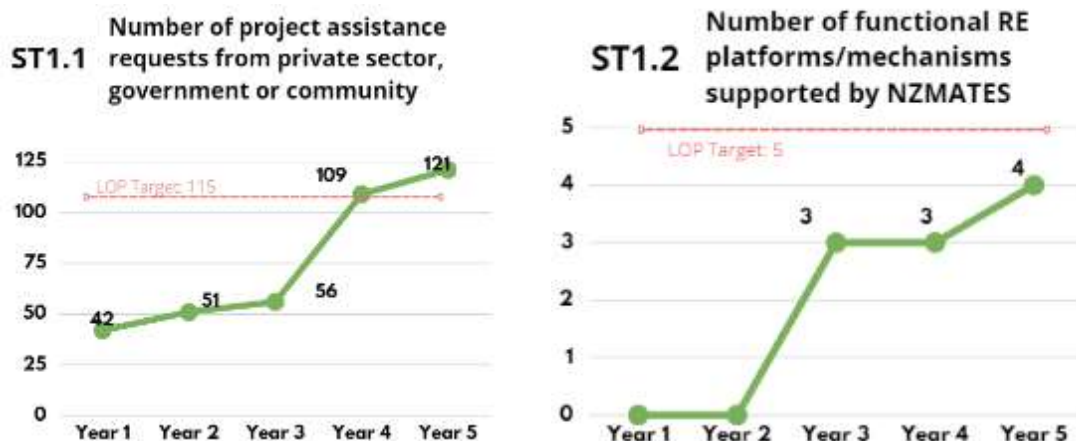
Figure 14: Mansoor Shah speaks to PLN MMU's Power Generation Division about RE asset management and operation and maintenance.

The average participant satisfaction rate from this year’s training activities was slightly below target at 85% (O4.4). Based on post-training feedback, most participants agreed that trainings provided by NZMATES were relevant to their daily work, while 89% said that their practical skills on solar power plants had increased. Most participants also agreed that the training methods helped participants to understand the material. For more detail, the diagram below presents satisfaction rates for each training. The 3 trainings with lower satisfaction rates were Guest Teaching for SMK 4, Teacher Training for SMK 4 and Guest Lecture at PNA. The main issues raised in feedback were a lack of time allocated for training and a need for follow-up training to deepen their knowledge.



1.3 Progress towards short-term outcomes

Short-term outcome 1: Platforms for RE initiatives established by or between local government actors, education institutions and industry players in partnership with NZ and other donors



The rate of new project requests from partners slowed this year, as the focus moved from appraisal of new projects to the implementation of existing ones. The 12 new requests this year (ST1.1) were:

- Four hybrid PLTS sites identified by PLN for inclusion in GCF and IRENA funding proposals
- Six previously un-assessed locations in Maluku included in the list of proposed sites for PLN’s national Diesel Replacement Programme (DRP)
- Saparua and Tual tidal energy research sites, proposed by UNPATTI

Regarding indicator ST1.2, one new platform was identified through the Stories of change consultancy, namely planning mechanism in which BAPPEDA and PLN collaborated to analyse PLN data as a basis for developing regional planning.



Figure 15: VUW, UNPATTI, BRIN and NZMATES at the tidal energy research site in Saparua.

Short-term outcome 2: RE projects are funding and implementation ready

ST2.1 Number of off-grid projects meeting funding-ready criteria and/or ready to be implemented



ST2.2 Number of grid-connected projects meeting funding-ready criteria and/or ready to be implemented



Four new projects reached funding-ready status in the last year, two off-grid (ST2.1) and two grid-connected (ST2.2):

- Tayando Yamtel – PLN LisDes site which NZMATES and PLN visited together and full FS has been completed. PLN has agreed this is a priority site for implementation in 2023 and budget has been allocated.
- Kolaha – this is one of four sites proposed for DAK funding by Dinas ESDM, and a full FS was prepared by NZMATES and Dinas ESDM. While the DAK funding was allocated elsewhere, EBTKE has indicated that Kolaha will be one of two Maluku sites allocated APBN funding for implementation in 2023.
- Two PLTS rooftop sites in Ambon, the building of the Provincial Transport Agency and building of the Provincial Education Agency. NZMATES had been involved in surveying these buildings previously, and they were since allocated funding and installation is almost complete.

Short-term outcome 3: Skills and knowledge of key government, education and industry partners increases.

ST3.1 Number of PLN and ESDM staff with increased skills and knowledge after participating in training activities through NZMATES.



ST3.2 Number of individuals from other organisations with increased RE skills and knowledge after participating in training activities through NZMATES.



Indicators ST3.1 and 3.2 are measured by comparing pre- and post-test results of training participants. Where a participant increases their test score after attending training, they are considered to have improved their skills/knowledge. Note that pre- and post-tests are not used at all trainings, and often participants who join a training late or leave early are missed in these figures. It is also worth noting that training participants are not double counted.

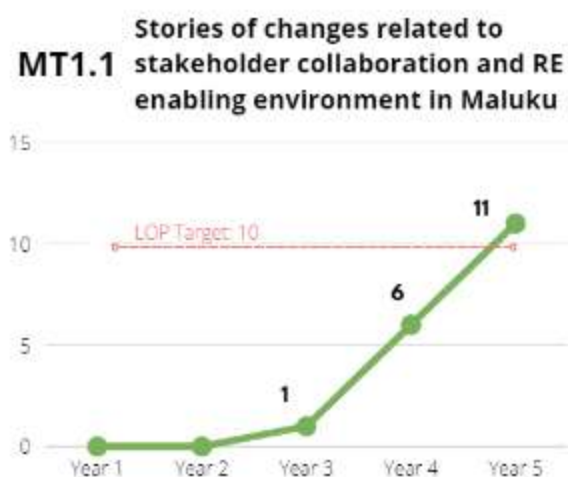
13 new PLN and Dinas ESDM staff showed increased skills and knowledge (ST3.1) after NZMATES training, bringing the total number of key partner staff impacted to 82. It should be noted that the 13 new people added during this reporting year do not include those who had previously already increased their skills and knowledge in previous years. The new participants were mainly from PLN staff attending the advanced HOMER training and field survey for FS preparation training.

For ST3.2, 31 new individuals from other organisations saw increased skills and knowledge after participating in NZMATES training. These were mainly PNA students attending NZMATES guest lectures, and PLTS operators who joined the H&S and O&M trainings.

1.4 Progress towards medium-term outcomes

Strong progress continued towards medium-term outcomes in year 5, with the most significant achievement being a large number of projects receiving funding commitments under indicator MT2.1, an area where progress has previously been slow.

Medium-term outcome 1: Improved collaborations and enabling environment to support RE in Maluku



The Stories of Change consultancy provided evidence of a number of previously un-recorded changes related to indicator MT1.1. The raw results provided by the consultants has been analysed by NZMATES and the large numbers of changes mentioned in the consultancy report have been consolidated to record only the most significant and well-evidenced changes under this indicator. Five new changes are reported here, summarised in the graphic below.

- 01** PLN MMU is more confident to get new investors because now they have the skill to produce more accountable, efficient, and effective feasibility studies as the result of Homer Training.
- 02** The Regional General Energy Plan (RUED) is the NRE roadmap for Maluku until 2050. It provides Framework for ESDM. With the existence of RUED, the Government of Maluku Province will be encouraged to prioritize the NRE.
- 03** Multi-sector collaboration in The Regional General Energy Plan (RUED) drafting. Electricity now is not only the task of PLN and ESDM but a shared responsibility.
- 04** Since being introduced to solar power plants, BAPPEDA has been motivated to make innovations in meeting energy needs in Maluku.
- 05** Mr. Lory, Lecture of Politeknik Negeri Ambon, contributed to the development of training module for Solar Power Plant Training. His involvement was the request from Vocation Training Centre of The Indonesian Ministry of Labour NRE.

Figure 16: Five new changes identified during the Stories of Change study related to collaboration and RE enabling environment.

MT1.2 Number of collaborative actions to support RE in Maluku



Two new collaborative actions (MT1.2) were also identified in the past year, namely:

- Tidal current research collaboration between VUW and UNPATTI
- NZMATES collaborated with Politeknik Negeri Ambon to provide guest lectures to Vocational Highschool students

Medium-term outcome 2: Renewable energy projects secure funding

MT2.1 Number of off-grid RE generation projects from the NZMATES pipeline that have secured implementation funding.



A major milestone for this year was the allocation of funding to a significant number of projects from the NZMATES pipeline (MT2.1). Progress against these indicators has been much delayed due to the COVID pandemic and associated budget reallocation. However two key achievements occurred this year:

- PLN has allocated budget for the implementation of 27 hybrid PLTS, 17 of which are in Maluku, under its LisDes programme for 2023.
 - The 2024 allocation includes over 100 hybrid and off-grid PLTS sites in Maluku and North Maluku.

- Two sites proposed by Dinas ESDM and NZMATES for funding under the DAK programme have instead been selected for APBN funding by EBTKE. These have not yet been included under indicator MT2.1 as NZMATES is still awaiting formal communication of the budget allocation from EBTKE.

Two new grid-connected projects received funding during the last year (MT2.2), namely the two PLTS rooftop sites funded by EBTKE in Ambon (buildings of the Provincial Transport Agency and Provincial Education Agency).

Additional projects on the radar that are expected to secure funding in the near future, include:

- Refurbishment of PLN PLTS on Neira Island, and potentially Elat PLTS
- Two rooftop sites in Maluku have reportedly been selected for funding by EBTKE for 2024
- IPP projects such as Namlea 5MWp PLTS

MT2.2 Number of grid-connected RE generation projects from the NZMATES pipeline that have secured implementation funding.



Medium-term outcome 3: Renewable energy projects implemented and operational

MT3.1 Number of off-grid RE generation systems from the NZMATES pipeline that are operating sustainably.

LOP Target: 10

In progress:

Refurbishment PLTS P Tiga

MT3.2 Number of grid-connected RE generation systems from the NZMATES pipeline that are operating sustainably.

LOP Target: 3

In progress:

Pūngao Pattimura Mini-grid Lab

As noted in the Stories of Change consultancy (see section 3 below), progress towards medium-term outcome 3 has been slow so far. While the progress under MTO 2 (above) is encouraging, there is quite a long lag time between projects being allocated funding and the completion of construction and fulfilment of sustainability criteria. It is expected that PLTS Pulau Tiga and the Pūngao Pattimura Mini-Grid Training Lab PLTS will be the first to meet these criteria, followed possibly by PLN LisDes locations and EBTKE PLTS rooftop installation.

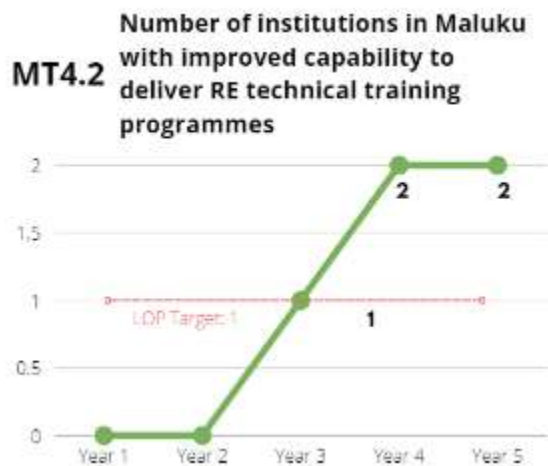
Medium-term outcome 4: Strengthened RE capability of key government, education and industry partners

MT4.1 Number of actions taken by partners to respond to/follow up on training and mentoring provided by NZMATES



Many new actions were identified as having been taken by partners to follow up on training received with NZMATES support, mostly through the Stories of Change consultancy. In summary, these are:

5. Micro-hydro team formed by PNA and UNPATTI after RESD training
6. PNA lecturer Pak Eka Poltek provided RE training to SMK
7. PNA lecturer Pak Lory requesting training equipment for PNA to expand its RE teaching programme
8. Quality of Feasibility Studies prepared by PLN has increased
9. PLN opened a basic training on use of Homer software PLN MMU has shared its knowledge on FS preparation with other units
10. PNA modified curricula and syllabus to include RE topics
11. UNPATTI added solar power plants as an optional subject in Marine Engineering Programme
12. Use of solar lab by UNPATTI for lecturing and research especially related to Solar PV panels
13. Mr. Antoni (UNPATTI) initiated mobile solar innovation that can be used later by the students
14. UNPATTI introduced solar energy to communities during community service programme
15. PLN adapted their site survey methods after NZMATES training on site survey methods for FS



The two institutions in Maluku with improved capability to deliver RE technical training programmes (MT4.2) are still Pattimura University and Politeknik Negeri Ambon. While no new institutions were added during the past year, the capacity building efforts mentioned under output 4 in section 1.2 above have contributed to further strengthening the capacities of both institutions. In particular, PNA is now working towards establishing a dedicated RE programme under its Electrical Engineering department.



Figure 17: NZMATES RE Technical Officer Maharani Holle assists PLN staff during training on HOMER modelling for hybrid FS in August 2022

2 STORIES OF CHANGE

In 2022 NZMATES hired CIRCLE consultants to conduct a study on Stories of Change. The consultants interviewed several key NZMATES partners and identified what kinds of changes are occurring and the extent to which NZMATES support has contributed to these. The study also analysed to what extent changes are in line with NZMATES MEL targets and expectations, and provided recommendations for improving outcomes, which included significant engagement with partners.

This study confirms that the change pathways outlined in the NZMATES MEL Plan are indeed occurring, moving from changes at the individual level to those at the institutional level, and from one institution to another, leading to changes in several institutions within one group. The programme is already achieving medium-term outcomes, with different levels of achievement for outcome areas 1, 2 and 3. The programme showed good progress for Outcome Area 1 (improved collaborations and enabling environment to support RE in Maluku) and Outcome Area 3 (strengthened RE capability of key government, industry and education partners), where progress has already exceeded the target. With a flexible approach, the programme team has been able to adapt work plans to partner’s needs and the changing situation on the ground, as long as there is still alignment with programme outcomes. Meanwhile, progress in Outcome Area 2 (new and/or revitalization on and off-grid projects supported by NZMATES are implemented and operational, meeting sustainability criteria) is still at a lower level, as shown in the below diagram.



There are two main reasons that affect the lower achievement of Outcome Area 2. PLN has produced several good quality projects following the technical assistance of NZMATES, but there have not yet been any investors providing funding for PLN projects. Several factors are identified as contributing to this, including the shifting of government budget for COVID-19 pandemic response, a lack of clear legal basis providing incentives for investment in RE, a lack of certainty around sustainable management models for RE systems installed outside of PLN areas, and challenging rules around transfer of assets.

www.nzmates.org

The report notes that NZMATES' proposed Maluku Energy Stakeholder Forum could provide a forum where some of these challenges could be discussed and solutions proposed.

Partner institutions from the government, including PLN, also indicated that NZMATES has played a very significant role in the acceleration of green energy. It is true that without NZMATES, the government could still have run its RE programmes, but it would have taken a much longer time and more resources to reach the current level of development. The government has very limited resources, and a number of priorities which demand the allocation of resources. Therefore, reflecting on the project development cycle, change at NZMATES' partners has reached the Fund-matching and Partnership phase.



3 CROSS-CUTTING ISSUES

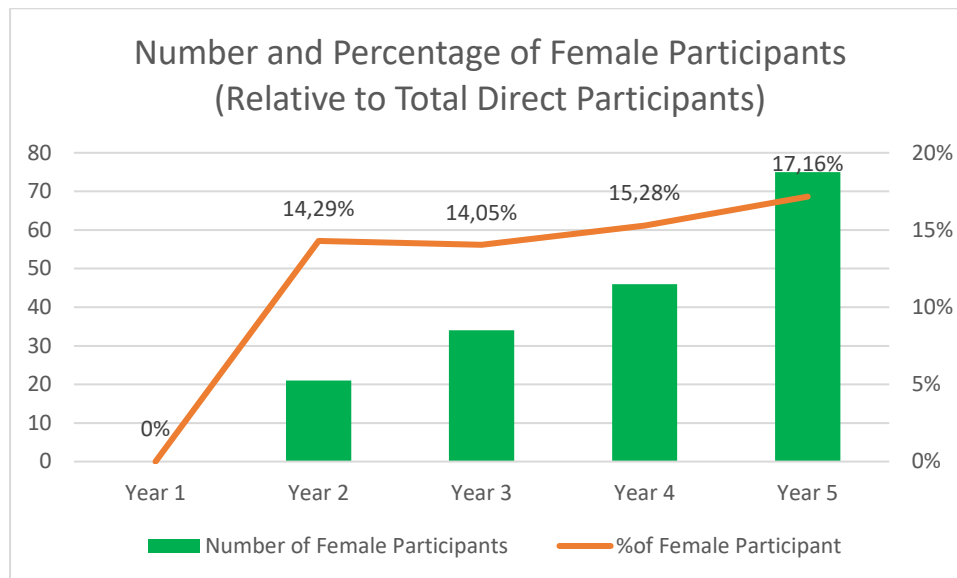
3.1 Human rights

NZMATES continued to focus on promoting human rights by grounding all activities in a strong understanding of social, cultural and economic context, including any underlying structures of power or vulnerability, to avoid contributing to human rights violations. Field assessments always include gathering data on social, environmental and economic factors that could affect the ability of certain groups to enjoy their human rights, such as land ownership and identifying any vulnerable groups. Thanks to NZMATES training and mentorship, PLN MMU is also starting to incorporate more social data gathering and community engagement into its own site survey activities.

NZMATES also continued to implement its Community Accountability and Reporting Mechanism (CARM) as part of Mercy Corps Global Safeguarding Policy. Within CARM, anyone can submit feedback, complaints, or report suspicious behaviour of any team member, partner or consultant to a designated point person in Mercy Corps. Each submission is responded to depending on its level of urgency, and an escalation process is in place for feedback relating to serious allegations of wrongdoing to ensure they are dealt with appropriately. Informant data is confidential and is shared only to team members who are responsible for responding to the report. NZMATES has engaged with the community on Pulau Tiga to identify the most appropriate feedback channels, and these will be implemented once the contract is signed with the EPC contractor to ensure any community concerns can be easily reported and responded to.

3.2 Gender

NZMATES has continued to strive to increase the number of women participants across training activities. So far, a total of 76 women have participated in NZMATES trainings. This is 17.16% of the total number of training participants, a further increase on the previous year at 15.28%. However, it is still behind NZMATES' target for 20% of training participants to be women.



Special Study on Barriers and Opportunities to Women's Participation in Maluku's Energy Sector

As a follow up to NZMATES Women in Energy initiative, conducted in 2021 and 2022, a team of consultants was hired to conduct broader research into the factors influencing women's participation in the energy sector in Maluku. This study responds not only to a knowledge gap identified by NZMATES, but also to requests from partners such as EBTKE and BAPPEDA.

Data collection for the Study of Women's Role and Participation in the Energy Sector in Maluku Province has largely been completed. Currently, the consultant is working on analyzing data and drafting the report.

Initial findings of this study show that women's roles in the energy sector in Maluku are very limited. Women have been positioned as users of new renewable energy in the domestic arena, providing firewood and kerosene oil for household needs. It is also found that women participate in the installation of energy in the context of community cooperation (gotong royong), however, they have no role in planning, managing, monitoring and evaluation processes. Patriarchal cultural systems have reduced women's participation in the public sector, including the energy sector. Furthermore, a lack of knowledge about New and Renewable Energy makes women insecure and afraid to actively contribute to this sector.

Limited roles for women are also the result of an absence of political will to support women in the energy sector. Gender mainstreaming has not been a concern in the regulation of the energy sector at the national, provincial or district level, even though a national policy on this has been initiated since 2000.

The consultants have preliminarily recommended four strategies to address this situation, namely: (1) capacity building for women, (2) structural strategy through providing policy or regulation that supports women's roles, (3) building networking that enables women to access the legislative or other key stakeholders to voice their opinions, and (4) institutionalize women's leadership practices in government to raise women up as role models in development, especially in the energy sector.

3.3 Environment and Resilience

Mitigating climate change and environmental impact has always been at the heart of the NZMATES Programme, which aims to support the Government of Indonesia's targets:

- Increasing renewable energy to 23% of the total energy supply by 2025 and 31% by 2050 (NEP, 2014);
- Reducing unconditionally 26% of its greenhouse gases against the business-as-usual scenario by the year 2020 (UNFCCC, 2015) and conditional reduction of up to 41% reduction by 2030 (COP21, 2015).

This year, NZMATES conducted a public dissemination event for its Solar Energy Waste Management Guidelines, targeted at Provincial and District-level stakeholders, especially districts that are home to broken solar mini-grids in need of de-commissioning. The guidelines are intended to support the responsible management, recycling and disposal of old solar PV and BESS system components, to avoid them posing a hazard to the natural environment. This is a topic of great interest not only to local government stakeholders but also to PLN.

NZMATES also continues to take actions to reduce the use of single use plastic at events and other activities, including providing reusable cups and water gallons instead of single use plastic water bottles, and rejecting the use of plastic banners unless strictly necessary.



Figure 18: Broken PLTS surveyed for refurbishment on Banda Neira island. Old components, like the damaged panels seen here, need to be disposed of responsibly.

4 NEXT STEPS

For full details on next steps please see the eleventh Forward Operating Plan (FOP). A high-level summary of planned next steps is provided below, for semesters 11 and 12 of the NZMATES programme, from April 1st 2023 – March 30th 2024. For the full plan for semester 11 of the NZMATES programme, and an outline of estimated semester 12 activities, please refer to the eleventh Forward Operating Plan (FOP).

Table 1: Key tasks planned for FOP 11

Key Task	Timeline
Maintain office operations and stakeholder relationships	Ongoing
Sign amendment to Partnership Arrangement extending NZMATES until July 2024	Apr 2023
Complete FS for PLTS Rhun, Ai, Hatta and Langgiar	Apr 2023
Complete baseline for Pulau Tiga community impact study	Apr 2023
Complete contracting process and kick-off refurbishment of Pulau Tiga PLTS, including community engagement activities	Apr 2023
Hold 9 th and 10 th TC meetings	May & Sep 2023
Kick off English language training for partners	May 2023
Finalise VUW UNPATTI research collaboration and define next steps	May 2023
Finalise Pulau Tiga PLTS sustainability planning with PLN	Jun 2023
Complete implementation of ToT for UnPatti solar lab trainers	Jun 2023
Sign Project Agreement and conduct procurement for PLN O&M Platform, begin implementation	Jun 2023
Hold 8 th PSG meeting	Jun 2023
Support establishment of Maluku Energy Stakeholder Forum and hold inaugural meeting	Jul 2023
Finalise solar rooftop campaign for commercial sector in Ambon	Jul 2023
Complete support for EBTKE 2022 rooftop PLTS supervision	Jul 2023
Finalise study on barriers and opportunities to women's participation in the energy sector in Maluku	Jul 2023
Conduct community baseline surveys for other selected project locations (e.g. Tayando)	Oct 2023
Support Dinas ESDM in implementation of RUED	Dec 2023
Complete construction of Pulau Tiga refurbishment	Dec 2023
Support implementation of EBTKE-funded PLTS in Kolaha and Waria	TBD
Continue to support development and implementation of PLN LisDes and refurbishment programmes as needed	Ongoing
Continue to support GCF CN development	Ongoing
Continue training and mentoring activities for Dinas ESDM and PLN MMU	Ongoing

ANNEX 1: NZMATES INDICATORS

Level	Result	No.	Performance Indicator
Long term outcome	Improved access to electricity in target areas	LT1.1	Electrification rate in Maluku Province.
		LT1.2	Number of communities with new or improved access to electricity from RE sources through NZMATES.
Long term outcome	Increased use of renewable energy in target areas	LT2.1	Percentage (%) of electricity produced in Maluku from renewable energy sources.
Medium term outcome	Improved collaborations and enabling environment to support RE in Maluku	MT1.1	Stories of changes related to stakeholder collaboration and RE enabling environment in Maluku
		MT1.2	Number of collaborative actions to support RE in Maluku
Medium term outcome	Renewable energy projects secure funding	MT2.1	Number of off-grid RE generation projects from the NZMATES pipeline that have secured implementation funding.
		MT2.2	Number of grid-connected RE generation projects from the NZMATES pipeline that have secured implementation funding.
Medium term outcome	Renewable energy projects implemented and operational	MT3.1	Number of off-grid RE generation projects from the NZMATES pipeline that are operating sustainably.
		MT3.2	Number of grid-connected RE generation projects from the NZMATES pipeline that are operating sustainably.
Medium term outcome	Strengthened RE capability of key government, education and industry partners	MT4.1	Number of actions taken by partners to respond to/follow up on training and mentoring provided by NZMATES
		MT4.2	Number of institutions in Maluku with improved capability to deliver RE technical training programmes
Short term outcome	Platforms for RE initiatives established by or between local government actors, education institutions and industry players in partnership with NZ and other donors	ST1.1	Number of project assistance requests from private sector, government or community
		ST1.2	Number of functional RE platforms/mechanisms supported by NZMATES
Short term outcome	Renewable energy projects are funding and implementation ready	ST2.1	Number of off-grid projects meeting funding- and implementation-ready criteria.
		ST2.2	Number of grid-connected projects meeting funding- and implementation-ready criteria
Short term outcome	Skills and knowledge of key government, education and industry partners increases	ST3.1	Number of PLN and ESDM staff with increased skills and knowledge after participating in training activities through NZMATES.
		ST3.2	Number of individuals from other organisations (companies, communities, educational institutions) with increased RE skills and knowledge after participating in training activities through NZMATES.
Output	Programme platform operating	O1.1	Qualified PMO team in place.
		O1.2	PMO has sound, relevant procedures and policies in place, approved by Programme Manager and updated annually.
		O1.3	Results framework reviewed annually and endorsed by PSG.
		O1.4	Number of PSG meetings that are well-attended and produce clear outcomes.

		O1.5	Number of TC meetings that are well-attended and produce clear outcomes.
Output	Programme framework mapped and in use	O2.1	Institutional framework mapping updated annually and approved by PM.
		O2.2	Technical framework analysis updated annually and approved by PM.
		O2.3	Financing, funding, and grants catalogue updated annually and approved by PM.
Output	Renewable energy projects progress smoothly through the project pipeline	O3.1	Number of RE projects in the NZMATES pipeline that have made progress towards funding.
		O3.2	Number of RE project documents (assessments, reports, studies, surveys, or proposals) made to support the progress of NRE projects through the NZMATES pipeline with partner approval
		O3.3	Number of RE projects or initiatives appraised for potential inclusion in the pipeline
Output	Training and mentoring provided according to RE skills gaps identified	O4.1	Number of people who receive training through NZMATES
		O4.2	Number of training activities conducted aligned with identified skill gaps.
		O4.3	Number of training arrangements established between Indonesian and NZ universities or other educational institutions
		O4.4	Percentage of people reporting satisfaction with relevance of training.



Figure 19: NZMATES Senior Community Engagement Officer Marie De Fretes informs the community on Pulau Tiga about upcoming plans to refurbish the PLTS.

ANNEX 2: SUMMARY OF PROGRESS AGAINST INDICATORS

The table below shows progress so far against output and short-term and medium-term outcome level indicators.

No.	Indicator	Year 1	Year 2	Year 3	Year 4	FOP 9	FOP 10	LOP target	Comments on FOP 9 & 10 progress
O1.1	Qualified PMO team in place	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
O1.2	PMO has sound, relevant procedures and policies in place, approved by Programme Manager and updated annually.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
O1.3	Results framework reviewed annually and endorsed by PSG.	No	Yes	Yes	Yes	Yes	Yes	Yes	
O1.4	Number of PSG meetings that are well-attended and produce clear outcomes.	0	2	2	5	6	7	9	6 th PSG held in May-22 7 th PSG held in Dec-22
O1.5	Number of TC meetings that are well-attended and produce clear outcomes.	1	3	4	6	8	8	9	7 th TC Meeting held in March-22 8 th TC Meeting held in Sep-22
O2.1	Institutional framework mapping updated annually and approved by PM.	Partial	Yes	Yes	Yes	Yes	Yes	Yes	
O2.2	Technical framework analysis updated annually and approved by PM.	Partial	Yes	Yes	Yes	Yes	Yes	Yes	
O2.3	Financing, funding and grants catalogue updated annually and approved by PM.	Partial	Yes	Yes	Yes	Yes	Yes	Yes	
O3.1	Number of RE projects in the NZMATES pipeline that have made progress towards funding.	0	14	17	67	80	84	15	New projects in NZMATES pipeline: 68-71. DAK PLTS locations (Mangur Niela/Tiflean, Ujir, Kolaha, Waria) 72. PLTS Puskesmas - Talaga Kambelo 73. PLTS Puskesmas - Iha 74-81. New IRENA locations (Waepandan, Manipa, Kiandarar, Werinama, Laimu, Letwurung, Pasanea, Tapa) 82. PLTS Rooftop - Dinas Pendidikan 83. PLTS Rooftop - Dinas Perhubungan 84. PLTS refurbishment Banda Naira
O3.2	Number of assessments, studies or surveys conducted to support RE projects and received by partners.	0	12	25	33	39	41	NA	New reports submitted: 34. DAK-Mangur Niela & Tiflean proposal 35. DAK-Ujir proposal 36. DAK-Kolaha proposal 37. DAK-Waria proposal

No.	Indicator	Year 1	Year 2	Year 3	Year 4	FOP 9	FOP 10	LOP target	Comments on FOP 9 & 10 progress
									38. RUED final documents 39. FS for 10 GCF/Irena locations 40. Tayando PLTS FS 41. Concept Note PLTS Puskesmas
O3.3	Number of RE projects or initiatives appraised for potential inclusion in the pipeline	42	54	108	113	113	60		New projects appraised: 109. PLTS Puskesmas 110-113. IRENA/GCF locations not previously appraised (Waepandan, Kiandarar, Laimu, Pasanea)
O4.1	Number of people who receive training and/or mentoring through NZMATES	2	147	247	301	426	438	350	+16 from SMK guest teacher +3 from SMK teacher training +9 for PLTS operator HSS training +86 for PNA guest lecture +2 for PLTS operator O&M training +9 for PLN advanced HOMER training +1 for PLTS operator O&M training part 2 +10 for PLN LisDes FS site survey training +1 PLN lifecycle costs and O&M trainings
O4.2	Number of training activities conducted aligned with identified skill gaps.	0	5	9	13	19	23	10	New trainings: 14. Guest teacher SMK 15. Training for SMK Teacher 16. HSS Training 17. Guest Lecture PNA 18. PLTS operator O&M training 19. PLN advanced HOMER training 20. PLTS operator O&M training part 2 21. PLN LisDes FS site survey training 22. PLN lifecycle project costs 23. PLN O&M and asset management
O4.3	Number of training arrangements established between Indonesian and NZ universities or other educational institutions	0	0	0	0	0	1	1	MoU signed between UNPATTI and Victoria University Wellington.
O4.4	Percentage (%) of people reporting satisfaction with the relevance of training.	-	90.2%	86.92%	85.85%	83.84%	85%	90%	Satisfaction level for each training in Year 4: - Guest teacher SMK (78.79%) - Training for SMK Teacher (73.33%) - PLTS operator HSS Training (80.70%)

No.	Indicator	Year 1	Year 2	Year 3	Year 4	FOP 9	FOP 10	LOP target	Comments on FOP 9 & 10 progress
									<ul style="list-style-type: none"> - Guest Lecture PNA (73.72%) - PLTS operator O&M Training (100%) - PLN advanced HOMER training (96.49%) - PLTS operator O&M training 2 (82.05%) - PLN LisDes FS site survey training (91.3%)
ST1.1	Number of project assistance requests from private sector, government or community	42	51	56	109	119	121	115	New project requests: 110. GCF/IRENA - Waepandan 111. GCF/IRENA - Kiandarar 112. GCF/IRENA - Laimu 113. GCF/IRENA - Pasanea 114. Dedieselisasi - Saparua 115. Dedieselisasi -Haruku 116. Dedieselisasi - Ondor 117. Dedieselisasi - Lonthor 118. Dedieselisasi - Larat 119. Dedieselisasi – Taniwel 120. Saparua tidal current energy 121. Tual tidal current energy
ST1.2	Number of functional RE platforms/mechanisms supported by NZMATES	-	-	3	3	3	4	5	Functional RE platforms: <ul style="list-style-type: none"> - Planning Mechanism: BAPPEDA and PLN collaborate to analyze PLN data as basis for planning
ST2.1	Number of off-grid projects meeting funding-ready criteria and/or ready to be implemented.	0	1	9	9	10	11	15	Off-grid projects funding and/or implementation ready: 10. PLN LisDes PLTS Tayando 11. PLTS Kolaha
ST2.2	Number of grid-connected projects meeting funding-ready criteria and/or ready to be implemented.	0	0	3	3	6	6	5	Grid-connected projects funding and/or implementation ready: 4. IPP Namlea 5. PLTS rooftop Dishub 6. PLTS rooftop Disdik
ST3.1	Number of PLN and ESDM staff with increased skills and knowledge after participating in training activities through NZMATES.	0	20	63	69	74	82	40	# Of PLN and ESDM Staff with increased skills and knowledge: +3 participants from PLTS operator HSS +2 participant from PLN Advanced Homer +8 participants from PLN Lisdes FS

No.	Indicator	Year 1	Year 2	Year 3	Year 4	FOP 9	FOP 10	LOP target	Comments on FOP 9 & 10 progress
ST3.2	Number of individuals from other organisations (companies, communities, educational institutions) with increased RE skills and knowledge after participating in training activities through NZMATES.	0	40	51	64	95	95	20	# Of other individuals with increased skills and knowledge: +22 participants from PNA guest lecture +8 participants from operator HSS Training +1 participant from operator O&M Training
MT1.1	Stories of changes related to stakeholder collaboration and RE enabling environment in Maluku	NA	NA	1	6	6	11	10	New stories of change: 7) More accountable FS, PLN is more confident to get new investors 8) RUED provides a pathway to New and Renewable Energy for Maluku Province 9) Multi-sector collaboration for Regional General Energy Plan (RUED) 10) Knowing about solar motivates Bappeda to innovate 11) PNA lecturer Pak Lory's involvement in module development for Vocational Training Centre
MT1.2	Number of collaborative actions to support RE in Maluku	1	4	4	7	7	9	10	New collaborative actions: 8. Tidal current energy research in Saparua and Tual (collaboration between UNPATTI-VUW-BRIN-NZMATES) 9. NZMATES collaborated with Politeknik Negeri Ambon to provide guest lectures to Vocational Highschool students
MT2.1	Number of off-grid RE generation projects from the NZMATES pipeline that have secured implementation funding.	0	0	1	1	1	18	15	2-18. PLN LisDes PLTS locations (Tonujaya, Rhun, Ai, Hatta, Ollong, Guli-Guli, Teor, Warbal, Ur, Tanimbar Kei, Dullah Laut, Tayando Langgiar, Rerean, Adodomolo, Makatian, Matakus, Werwawan)
MT2.2	Number of grid-connected RE generation projects from the NZMATES pipeline that have secured implementation funding.	0	0	1	1	3	3	5	2. PLTS rooftop Dishub 3. PLTS rooftop Disdik
MT3.1	Number of off-grid RE generation systems from the NZMATES pipeline that are operating sustainably.	0	0	0	0	0	0	10	
MT3.2	Number of grid-connected RE generation systems from the NZMATES pipeline that are operating sustainably.	0	0	0	0	0	0	3	

No.	Indicator	Year 1	Year 2	Year 3	Year 4	FOP 9	FOP 10	LOP target	Comments on FOP 9 & 10 progress
MT4.1	Number of actions taken by partners to respond to/follow up on training and mentoring provided by NZMATES	NA	NA	2	4	6	15	10	New actions taken to respond to training and mentoring: 5. Microhydro team formed by PNA and UNPATTI after RESD training 6. PNA lecturer Pak Eka provided RE training to SMK 7. PNA lecturer Pak Lory requesting training equipment for PNA to expand its RE teaching programme 8. Quality of Feasibility Studies prepared by PLN has increased 9. PLN opened a basic training on use of Homer software 10. PLN MMU has shared its knowledge on FS preparation with other units 11. PNA modified curricula and syllabus to include RE topics 12. UNPATTI added solar power plants as an optional subject in Marine Engineering Programme 13. Use of solar lab by UNPATTI for lecturing and research especially related to Solar PV panels 14. Mr. Antoni (UNPATTI) initiated mobile solar innovation that can be used later by the students 15. UNPATTI introduced solar energy to communities during community service programme 16. PLN adapted their site survey methods after NZMATES training on site survey methods for FS
MT4.2	Number of institutions in Maluku with improved capability to deliver RE technical training programmes	NA	NA	1	2	2	2	1	Institutions with improved capability to deliver RE technical training: 1. UNPATTI 2. PNA

ANNEX 3: PIPELINE ACTIVITY SUMMARY

Pipeline task	Description / goal	Progress this year
RUED finalisation	Support Dinas ESDM to finalise General Regional Energy Plan (RUED) for Maluku Province.	Completed. Regulation has been enacted and approved by Governor. Final public dissemination held.
Pulau Tiga PLTS refurbishment	Finalise tender documents and conduct procurement process for PLTS Pulau Tiga refurbishment.	Tender winner is selected and to be announced in early May 2023 after tender result documents reviewed by Mercy Corps Global. Planning for sustainability and community engagement is conducted.
Waste management protocols and SOP	Guidance for local government on disposal of broken solar assets	Completed. Document finalised and dissemination event held with provincial stakeholders.
GCF concept note	Concept note to be submitted to GCF for a financing framework for RE projects in remote islands to be administered by PT SMI. PLN hybridisation projects to be included as potential pipeline for financing.	Consultant currently working on final draft concept note for submission to GCF board. Scope of financing facility increased from USD \$50M to USD \$250M.
Community engagement guidelines for Maluku energy projects	Guidelines aimed at PLN, Dinas ESDM and other provincial stakeholders to inform good practices when engaging communities for energy projects.	Completed. Guidelines finalised and shared with provincial stakeholders.
PLN O&M Platform	Development of cloud-based O&M management platform and pilot roll-out at 20 PLN sites in Maluku.	Renewable energy asset management training held for building capacity of PLN team on how O&M platform can help the asset management process. Project Agreement discussions ongoing.
IPP FS for Bula and Namlea FS for PLN MMU	Conduct FS for two potential PLTS, Bula (3 MWp) and Namlea (5 MWp) for PLN MMU.	Completed. Namlea project feasible, while Bula not feasible at this stage due to low load. Re-modelling of various scenarios done at PLN request on Bula project.

Support for EBTKE solar rooftop programme 2022	Rooftop PLTS installed on rooftops of two government buildings (Education and Transportation Agencies). NZMATES asked to support Dinas ESDM in supervising installation.	Installation complete, pending commissioning. NZMATES supported Dinas ESDM in supervision and coordination with contractor, as well as resolving several problems during the installation process.
DAK funds for Maluku National Fishery Barn RE project	Identify RE projects that support the Maluku National Fishery Barn initiative that can be proposed for funding through GoI DAK programme in 2022. Develop FS and proposal together with Dinas ESDM and submit for funding.	Proposals submitted for four potential PLTS sites. Although DAK funds were all allocated to Nusa Tenggara for this year, two of the four sites (Kolaha and Waria) were selected for direct APBN funding through EBTKE.
Feasibility studies for PLN LisDes hybridisation sites	97 FS on potential hybridisation projects conducted by PLN MMU and UP3 with support from NZMATES through training and mentoring. FS submitted to PLN head office for budget allocation.	NZMATES completed FS for one site (Tayando Yamtel) and PLN MMU has submitted for funding and implementation in 2023. Three more sites (Rhun, Ai and Hatta) FS are being prepared directly by NZMATES and are nearly finished. NZMATES provided training in field data collection and FS preparation for PLN MMU and UP3 to support the development of FS for remaining sites, and joint visits have been conducted to several of these locations.
PLN Dedieselisasi support	National programme to hybridise diesel grids with solar. 20 sites in Maluku for which NZMATES did pre-FS and/or FS studies have been included in phase I which is to start implementation in 2022 through IPP process.	NZMATES worked with PLN to do pre-FS studies for a large group of hybridisation sites, and supported MENTARI programme to deliver training for PLN in the use of HOMER software to conduct FS for hybrid PLTS projects. First groups of sites were put out to market for interested IPPs, however interest was low so programme is on hold for now.
Training of Trainers for Solar Lab	To provide support to Pattimura University in the form of renewable energy curricula and training material development and capacity building for trainers in solar PV.	Needs assessment conducted, draft curriculum prepared. Pending discussion with Engineering Faculty on which programme the course fits within and who should participate in the Training of Trainers activity.

PLN PLTS refurbishment sites Nine broken PLN-owned PLTS (Kur, Elat, Manawoko, Panjang, Kisar, Wetar, Kelang, Teor, Banda Neira) in need of refurbishment. Most were visited by NZMATES in 2019 but refurbishment postponed due to covid. PLN is now ready to allocate funding for the refurbishment so updated FS are to be prepared.

NZMATES visited Banda Neira PLTS and have prepared FS for refurbishment, which is near finalised.

Other sites are still pending discussions with PLN on NZMATES support needed for updating FS.



Figure 20: Delegates from MFAT, BAPPENAS, UNPATTI, NZMATES and VUW students visit the Pūngao Pattimura Mini-Grid Training Lab.