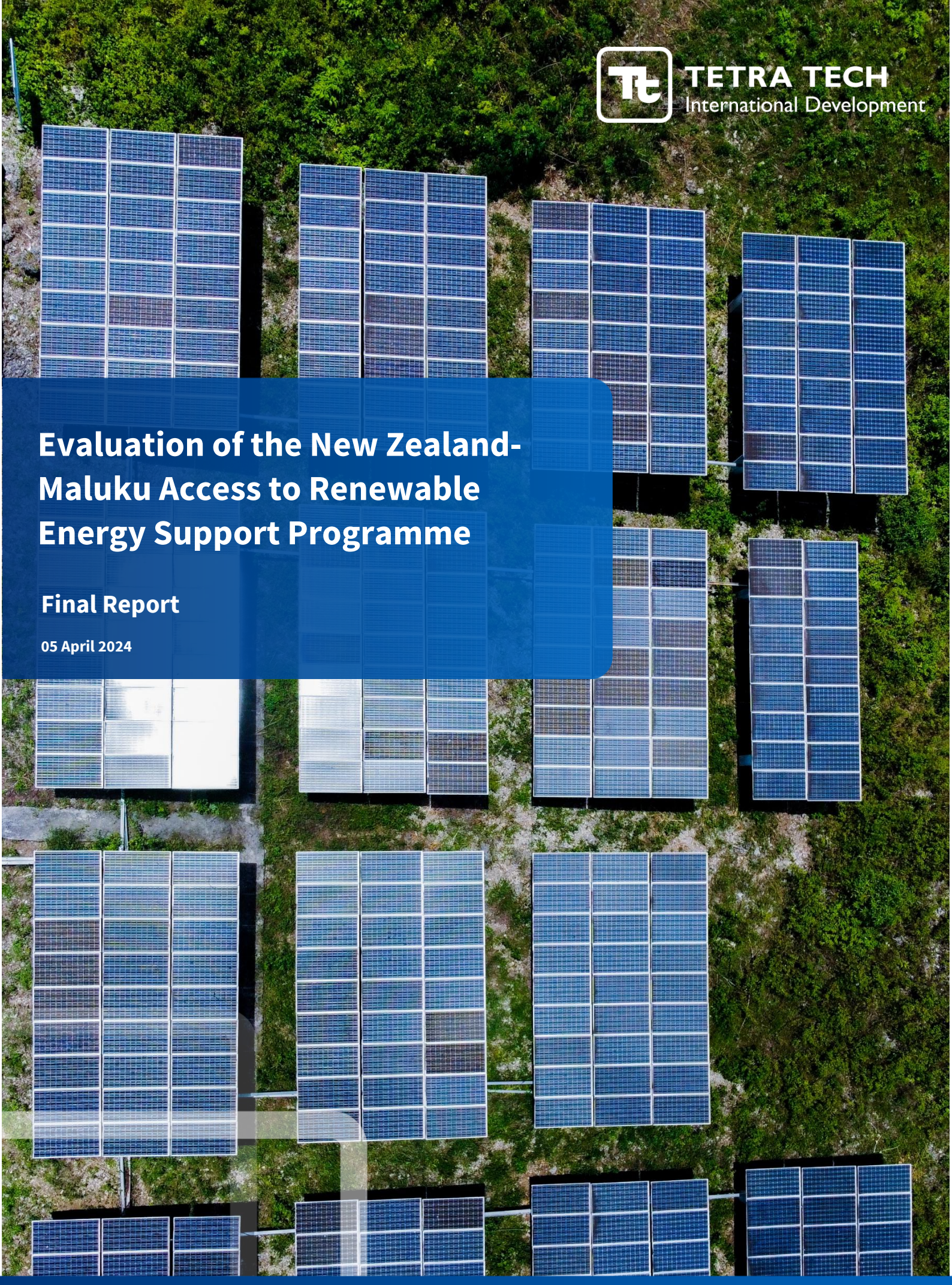

TETRA TECH
International Development

Evaluation of the New Zealand-Maluku Access to Renewable Energy Support Programme

Final Report

05 April 2024

Cover photo: Existing solar installation in Palau Tiga. Source: NZMATES

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Abbreviations

Abbreviation	Indonesia	English
ADB	Bank Pembangunan Asia	Asian Development Bank
BAPPEDA	Badan Perencanaan Pembangunan Daerah	Regional Development Planning Agency
BAPPENAS	Badan Perencanaan Pembangunan Nasional	National Development Planning Agency
DEN	Dewan Energi Nasional	National Energy Council
Dinas ESDM	Dinas Energi dan Sumber Daya Mineral (Provinsi Maluku)	Energy and Mineral Resources Office of Maluku Province
EBTKE	Direktorat Jenderal Energi Baru Terbarukan dan Konservasi Energi	Directorate General New Renewable Energy and Energy Conservation
FCDO		United Kingdom Foreign Commonwealth and Development Office
GGGI		Global Green Growth Institute
		Government of New Zealand
GOI		Government of Indonesia
MCI		Mercy Corps Indonesia
MEL		Monitoring, Evaluation and Learning
MENTARI	Menuju Transisi Energi Rendah Karbon Indonesia	Progress towards a Low Carbon Energy Transition in Indonesia
MFAT		New Zealand Ministry of Foreign Affairs and Trade
MOU		Memorandum of Understanding
NEP	Kebijakan Energi Nasional	National Energy Policy
NZMATES		NZ Maluku Access to Renewable Energy Support
O&M		Operations and Maintenance
PLN	Perusahaan Listrik Negara	State Electricity Company
PLN MMU	PLN Wilayah Maluku dan Maluku Utara	PLN Office for Maluku and North Maluku
PLTS	Pembangkit Listrik Tenaga Surya	Solar PV Power Plant
PNA	Politeknik Negeri Ambon	Ambon State Polytechnic
PSG		Programme Steering Group
PPSDM	Pusat Pengembangan Sumber Daya Manusia	Centre for Development of Human Resources
PT SMI	PT Sarana Multi Infrastruktur	PT Sarana Multi Infrastruktur
RE		Renewable Energy
RESD		Renewable Energy Skills Development programme
SINAR		Sustainable Energy for Indonesia's Advancing Resilience programme
TC		Technical Committee
UNPATTI	Universitas Pattimura	Pattimura University
USAID		United States of America Agency for International Development

Executive summary

Introduction

The New Zealand Ministry of Foreign Affairs and Trade (MFAT) engaged Tetra Tech International Development (Tetra Tech) to undertake an independent evaluation of the NZ Maluku Access to Renewable Energy Support programme (NZMATES). The evaluation was carried out from December 2023 to March 2024 and was intended to generate insights to inform a potential new phase of the programme by assessing its relevance, effectiveness, efficiency and impact. This report presents the evaluation findings and considerations for future decision-making.

Background and context

NZMATES, is an NZD $10 million investment designed to bolster the adoption of affordable, reliable, and renewable energy solutions in Maluku Province, Indonesia. The programme operates through a collaborative partnership involving the Directorate General of New Renewable Energy and Energy Conservation (EBTKE), the state-owned electricity provider Perusahaan Listrik Negara (PLN), and the New Zealand Ministry of Foreign Affairs and Trade (MFAT). Implementation is led by New Zealand-based renewable energy company, Infratec in partnership with Mercy Corps Indonesia.

Commencing in 2017, NZMATES is slated to conclude in December 2024.

The programme aims to achieve two long-term outcomes: (i) improved access to electricity and (ii) increased use of renewable energy in Maluku. This is achieved through three primary means of support:

1) The establishment of an office in Ambon and a governance and management structure involving key stakeholders (the **Programme Platform**) together with the development of a suite of analyses and documentation to ground the programme in an understanding of the institutional, technical, regulatory, socio-cultural and commercial features of the Maluku renewable energy context (the **Programme Framework**).
2) **Technical assistance** to guide potential renewable energy projects through a pipeline of activities to ensure they are feasible, commercially attractive, sustainable and responsive to needs.
3) **Capacity building** through the establishment of partnerships with education providers, and the provision of training and mentoring on renewable energy planning, operations and maintenance.

The evaluation

The purpose of the evaluation is to assess the relevance, effectiveness, efficiency and impact of NZMATES across its primary engagement areas.

Specifically, the evaluation aims to:

- Assess the relevance of NZMATES and the extent to which it has responded to MFAT's objectives, partners' priorities and community needs.
- Review the extent of progress made towards achieving intended outcomes and identify any unintended outcomes.
- Assess how the programme has supported New Zealand's International Development Principles of effectiveness, inclusion, resilience, and sustainability.
- Assess efficiency by examining the extent to which governance and management arrangements are adequately organised and operationalised to support the achievement of intended results.
- Consider how a new phase of renewable energy support could be more effective and focused, better managed/governed, achieve greater impact and advance New Zealand's interests.

Relevance and alignment

NZMATES aligns closely with Indonesia's aims to increase investments in renewable energy, targeting a minimum 23 per cent contribution by 2025 (rising to 31 per cent by 2050).

It also responds well to needs in Maluku which remains under-electrified compared with national averages and is heavily reliant on diesel-based electricity generation.

NZMATES is consistent with MFAT's development priorities and principles and supports New Zealand's use of renewable energy expertise to raise New Zealand's profile as a partner of choice in the energy sector. Specifically, it finds close alignment with the following key documents:

Joint Commitment for Development (2017-2024)
Indonesia-New Zealand Comprehensive Partnership (2020-2024)
ASEAN 4-Year Plan
International Cooperation for Effective Sustainable Development (ICESD)

Governance and efficiency

The NZMATES governance and management structure operates at three levels:

National level: The Programme Steering Group (PSG) oversees overall governance and strategic direction. PSG members include representatives from the NZ Embassy, EBTKE, and PLN.

Provincial level: The Technical Committee (TC) develops work plans and coordinates renewable energy projects at the provincial level. TC members include NZMATES, MFAT, PLN Maluku, and Dinas ESDM.

Working groups: Working groups within primary partner agencies (PLN and ESDM) in Maluku identify support needs, work priorities, and potential sites for renewable energy projects.

Implementation partnership: Implementation is contracted to New Zealand renewable energy company, Infratec, who have partnered with Mercy Corps Indonesia (MCI) to execute the programme.

The governance and management structure appears to be working as intended.

All stakeholders consulted as a part of the evaluation suggest that governance arrangements include the stakeholders necessary for effective coordination of renewable energy projects in Maluku and are functioning well, with suitable levels of commitment shown by all partners. This is especially true at the provincial level where NZMATES' presence in Ambon and the relationships fostered in Maluku are widely considered to be critical success factors underpinning the NZMATES model.

NZMATES seeks to leverage other actors to achieve outsized influence.

The NZMATES model works simultaneously to build capacity among key organisations responsible for advancing the GoI's National Energy Policy objectives in Maluku, while bringing key actors together to advance planning and coordination, and guiding potential projects through the necessary pre-implementation steps to achieve funding. In theory, this represents a very efficient model for promoting long-term renewable energy development. However, as the programme has not yet matured to a point where key results are evident, it remains to be fully validated.

Effectiveness and impact

Improved enabling environment

NZMATES has become a 'go to' hub for expertise on renewable energy in Maluku Province. In an environment where coordination between the major renewable energy actors is often challenging and stakeholders tend to operate in silos, NZMATES appears to have positioned itself as a useful intermediary. There is strong evidence that this has strengthened the enabling environment for renewable energy in Maluku.

Implemented and operational renewable energy projects

The assumption that technical assistance for potential renewable energy projects will be sufficient to unlock project funding, is yet to be validated. Key to the NZMATES approach is the idea that the pre-implementation steps in the pipeline facilitated and supported by NZMATES will pave the way for funding by proving the commercial and technical viability of potential projects. However, progress to date neither proves nor disproves this key assumption as insufficient time has passed to fully assess whether projects will successfully attract funding.

Strengthened renewable energy capability

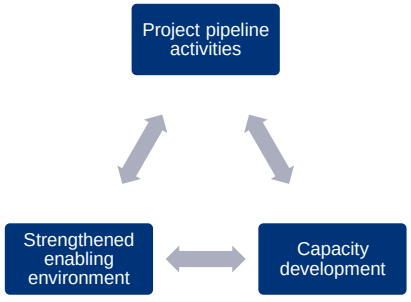
NZMATES is actively engaged in training and capacity-building initiatives aimed at enhancing knowledge and skills on renewable energy in the Maluku region. These efforts are not only improving awareness but also expediting the implementation of renewable energy projects.

NZMATES has fostered valuable partnerships with educational institutions, strengthening instruction and research related to renewable energy in the region. While these partnerships hold significant potential, additional time and investment is required to fully realise their potential.

NZMATES provides mentoring services to enhance planning alongside project pipeline activities. This practical, hands-on approach to skill development is highly valued by our partner organisations. However, due to the limited number of projects that have progressed to implementation, these efforts have primarily focused on pre-implementation activities.

Future directions

There is strong coherence and synergies between NZMATES three main work areas with each component building on and reinforcing the other.



The programme has built considerable expertise on the institutional, regulatory, socio-cultural, and technical features of the renewable energy context in Maluku and has used this and its presence in Ambon

to foster active and valued relationships. Capacity building and technical assistance activities build on these foundations and appear to have contributed effectively to achieving the programmes short-term objectives.

While there is strong evidence that NZMATES has strengthened collaborations and the enabling environment in Maluku and the capability of key government, education and industry partners, questions remain about the extent to which the programme will succeed in attracting funding for 'funding ready' projects, especially in small and remote locations. The limited number of projects that have secured funding and gone on to implementation thus far, provides an inadequate evidence base to fully prove or disprove this proposition.

The case for a second phase

The case for embarking on a second phase of the NZMATES programme is strong. Drawing upon the solid foundations established through the Programme Platform and Framework, NZMATES has carved out a distinctive niche in the renewable energy landscape of Maluku. Its current role in renewable energy planning and coordination in Maluku is pivotal, and there is strong and unanimous support for NZMATES continuation among key programme stakeholders.

Fully realising the potential of NZMATES investments to date is only possible if the programme continues to build on the foundations established during this initial programme period. Most stakeholders with insight into the programme suggest it is best viewed as close to a midway point and exiting now risks the gains made thus far.

Expanding NZMATES geographical scope

With NZMATES now firmly established and well-connected in Maluku, compelling arguments emerge for expanding its reach to include North Maluku if the programme continues to a new phase. Both EBTKE and PLN have expressed interest in this expansion. Notably, the PLN office in Ambon already serves both provinces, and the needs and context in these regions align closely. Furthermore, the development and renewable energy landscape in North Maluku remains relatively unsupported by national and international development initiatives.

Enhancing NZMATES engagement and funding strategies at the national level

NZMATES' visibility in Jakarta could be enhanced. A stronger national presence may foster partnerships and facilitate connections with potential funding sources.

The programme could enhance efforts to collaborate and exchange knowledge with peer programmes to maximise impact. In particular, there are potential synergies between NZMATES and the Renewable Energy – Accelerated Transition in Indonesia (RE-ACT) programme also funded by MFAT. A future phase should consider how NZMATES can take advantage of RE-ACT's efforts around de-risking instruments and financing mechanisms.

A new phase should also consider bolstering expertise in renewable energy financing and funding to navigate diverse funding channels and enhance funding opportunities.

Progressing technical assistance and capacity development

Programme progress to date has limited the ability of NZMATES to support practical hands-on skills development beyond the project planning stage. However, a potential future phase presents an opportunity to expand technical assistance and capacity building to encompass critical areas such as procurement, implementation, and ongoing operations and maintenance (O&M).

These areas play a pivotal role in ensuring the success of renewable energy projects and are greatly encouraged by programme stakeholders.

Strengthening local capacity within NZMATES

Recognising the relative scarcity of renewable energy technical skills in Maluku and the challenges associated with bringing in outside expertise, NZMATES made a strategic shift from external hiring to building the capacity of local Maluku-based staff. This transition is proving effective and warrants continuation.

Planning for asset transfer

A potential upcoming phase represents a valuable opportunity to proactively address asset transfer challenges from the outset. By doing so, NZMATES and MFAT can pave the way for a more streamlined processes going forward.

Enhancing monitoring and evaluation

A future phase should closely monitor the progress of projects through each stage of the pipeline, including the proportion of projects at each step. Identify bottlenecks and imbalances which should trigger management responses and changes in programme emphasis.

Leveraging collaborations with education providers for sustainable impact

Collaborations with educational institutions have emerged as a potentially powerful catalyst for long-term change within the NZMATES programme. While substantial progress has been achieved, the true milestone lies in successfully introducing autonomous and self-sufficient renewable energy programmes within these institutions.

This requires continued investment and support beyond the current programme period.

1. Introduction

The New Zealand Ministry of Foreign Affairs and Trade (MFAT) engaged Tetra Tech International Development (Tetra Tech) to undertake an independent evaluation of the NZ Maluku Access to Renewable Energy Support programme (NZMATES). The evaluation was carried out from December 2023 to March 2024 and was intended to assess the relevance, effectiveness, efficiency and impact of the programme, while generating insights to inform future renewable energy programmes. This report presents the evaluation findings and considerations for a potential new phase of the NZMATES programme.

1.1 Background and context

New Zealand and Indonesia have a long history of partnering to advance capacity for renewable energy in Indonesia. Much of this partnership has focussed on geothermal energy, reflecting both New Zealand's specialist expertise and Indonesia's abundant geothermal resources. In 2015, MFAT sought to build on this partnership by developing a concept for the provision of renewable energy support in Maluku Province. In 2017, this became the NZMATES programme.

Maluku is one of the least developed provinces in Indonesia, with its regional GDP, employment rate, life expectancy and economic growth all well below the national average. Scattered across more than 600 islands, Maluku Province presents a challenging geographical context for electrification, with an estimated 20 per cent of households classified as "not electrified" or "poorly electrified" in 2017 compared to the national average at the time of 4 per cent.

Despite having very good potential for renewable energy development, including widespread Solar PV potential and localised opportunities for hydro, biomass, biogas and wind power, the province remains heavily reliant on diesel for electricity generation. In 2017, more than 99 per cent of electricity generated by state electricity company Perusahaan Listrik Negara (PLN) in Maluku was estimated to be diesel-based.

NZMATES was designed as an initial 5-year NZD $10 million investment to support the uptake of affordable, reliable, and renewable energy in Maluku. The programme is delivered through a tripartite agreement between Directorate General New Renewable Energy and Energy Conservation (EBTKE), state-owned electricity provider, Perusahaan Listrik (PLN), and MFAT and is implemented by New Zealand-based renewable energy company, Infratec in partnership with Mercy Corps Indonesia.

The initial focus of the programme was on renewable energy projects on Seram Island, but in response to structural reforms in the Energy and Mineral Resources Office of Maluku Province (Dinas ESDM) that centralised planning from the Regency to Provincial level, the geographical scope was later expanded to encompass the whole of Maluku Province.

NZMATES began in 2017, and after being granted a no cost extension in 2022 due to COVID-19 related disruptions, is now scheduled to end in December 2024[1].

1.2 Delivery approach and programme logic

The NZMATES programme logic is oriented towards achieving two long-term outcomes: (i) improved access to electricity and (ii) increased use of renewable energy in target areas. This is achieved through three primary means of support:

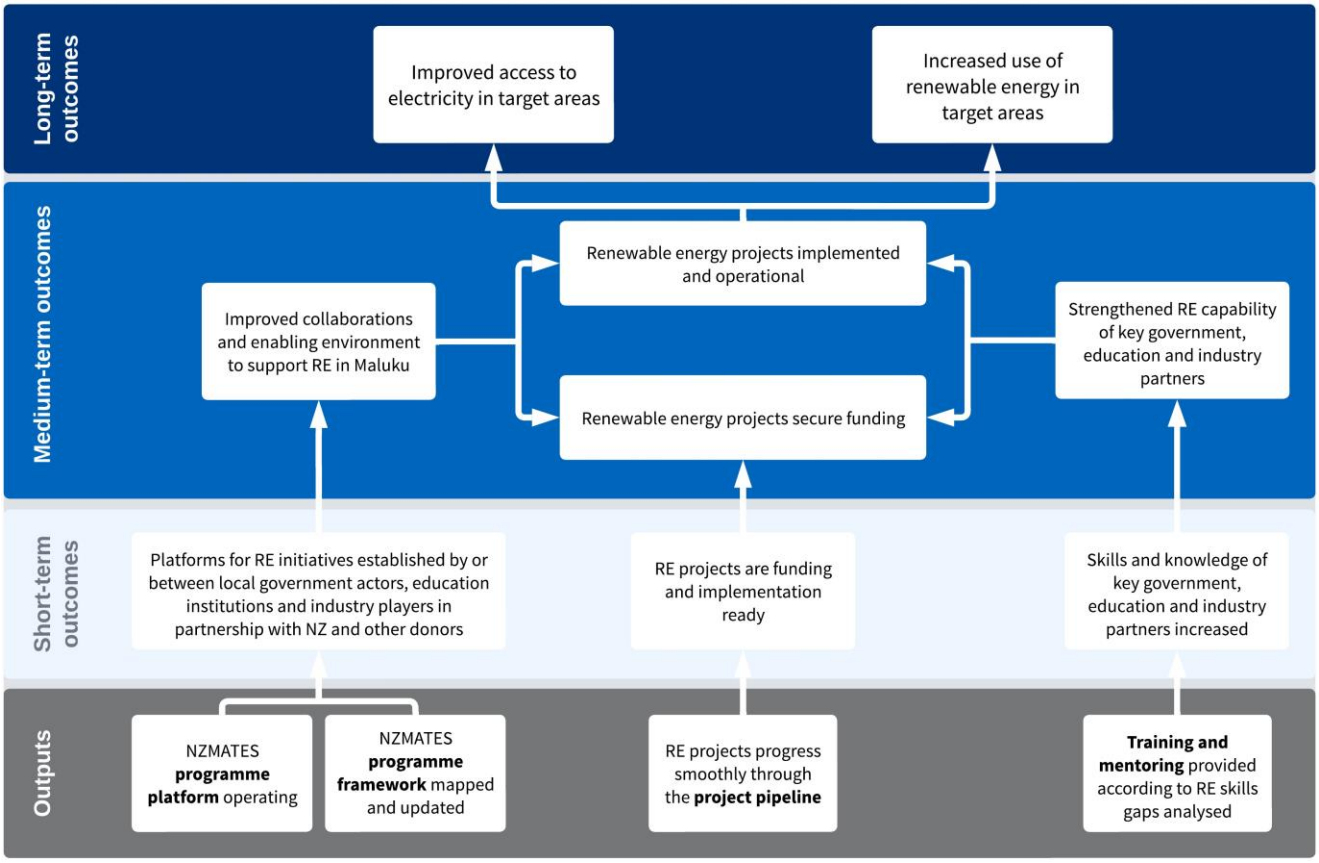
- **Programme Platform and Programme Framework**: The Programme Platform consists of the NZMATES office and programme team, the policies and procedures necessary for delivery, and the NZMATES governance and management structure. The NZMATES office in Ambon has been set up to facilitate partnerships and collaboration and strengthen the enabling environment for the development of renewable energy in Maluku. Collaborations are informed by a comprehensive analysis of the regulatory framework, political economy, technical plans and needs, and potential financing and funding sources that affect renewable energy development in Maluku, collectively referred to as the 'Programme Framework'.

[1] While the programme has been extended until June 2024, the Partnership Arrangement between MFAT, PLN and EBTKE has been extended until 31 July 2025 to allow time for asset transfer.

- **Technical assistance throughout the project pipeline**: NZMATES provides technical assistance at different stages of renewable energy projects to ensure they are feasible, commercially attractive, sustainable and responsive to needs. NZMATES collaborates with PLN, EBTKE, Dinas ESDM, and other actors to progress projects to the point where they are commercially viable or 'funding-ready'.
- **Capacity building:** NZMATES provides training, mentoring, technical exchange programmes, and facilitates interaction between Maluku educational institutions and NZ renewable energy specialists to enhance local public and private sector renewable energy capacity. NZMATES' focus on supporting and developing the capacity of local stakeholders is intended to ensure the programme's outcomes outlive the programme implementation period.

The full programme logic is presented in Figure 1 below:

Figure 1: NZMATES programme logic



2. The evaluation

The purpose of the evaluation is to assess the relevance, effectiveness, efficiency and impact of NZMATES across its primary engagement areas. The evaluation also aims to identify learning that can be applied to potential future phases of the programme as well as identify directions for renewable energy support that address barriers and strengthen engagement.

The objectives of the evaluation are to:

- Assess the relevance of NZMATES and the extent to which it has responded to MFAT's objectives, partners' priorities and community needs.
- Review the extent of progress made towards achieving intended outcomes and identify any unintended outcomes.
- Assess how the programme has supported New Zealand's International Development Principles of inclusion, resilience, and sustainability.
- Assess efficiency by examining the extent to which governance and management arrangements are adequately organised and operationalised to support the achievement of intended results.
- Consider how a new phase of renewable energy support could be more effective and focused, better managed/governed, achieve greater impact and advance New Zealand's interests.

See Annex A for a detailed description of the evaluation methods and approach.

2.1 Key evaluation questions

The evaluation team together with the Evaluation Reference Group developed the following key evaluation questions. The Evaluation Report presents analysis and assessment against all key evaluation questions.

Table 1: Key Evaluation Questions

Objectives	Key Evaluation Questions	Sub-questions
Relevance and Alignment	To what extent is NZMATES relevant to New Zealand 's bilateral and development priorities?	• Does NZMATES intent and design remain aligned with priorities outlined in key New Zealand policies and strategies, including the policy for International Cooperation for Effective Sustainable Development and the Joint Commitment for Development (2017-2024) with Indonesia?
	To what extent is NZMATES relevant to Indonesia's renewable energy and development priorities?	• Is the NZMATES intent and design aligned with priorities outlined in key Indonesian policies and strategies, including the Medium-Term National Development Plan 2020-2024 (RPJMN) and the Joint Commitment for Development (2017-2024) with Indonesia?
	To what extent is NZMATES relevant to local communities	• To what extent are NZMATES activities relevant to local contexts? • What key energy needs are being met for the community? • What service needs is NZMATES filling in the energy sector that would otherwise go unmet?
Impact and Effectiveness	To what extent has NZMATES made progress towards its intended outcomes?	• How has NZMATES supported New Zealand's International Development Principles of inclusion, resilience, and sustainability? • To what extent are skills and knowledge transfer effectively supporting strengthened RE capability in Maluku Province? • Is NZMATES contributing towards economic and social impacts for communities as a result of RE projects supported by NZMATES? • To what extent were the NZMATES outcomes achieved, what were the unintended outcomes? • Have platforms for RE between local government, education institutions industry stakeholders and donors been established and to what extent are they supporting RE in Maluku Province? • Are there synergies and interlinkages between the NZMATES-supported RE platforms, project pipeline and capacity strengthening)? • What factors have constrained or enhanced the Programme's progress towards intended outcomes?
Efficiency	To what extent are governance and management arrangements adequately organised and operationalised to support the achievement of intended results	• To what extent have governance arrangements been efficient and supported or hindered results? • To what extent has governance and oversight been sufficient to maximise programme effectiveness?
Future Directions	What are the lessons and recommendations generated through the current phase that can inform future design	• What lessons learned from the Programme could inform its future strategy and policy direction to ensure it is: – More effective and achieve more impact – More relevant and partner-driven – Better supports inclusive development – Ensures greater sustainability and resilience for partners – Better managed and governed for success • How can MFAT's support better integrate inclusive development and leverage opportunities to highlight New Zealand's interests?

2.2 Limitations

The evaluation team experienced no major challenges in delivering the evaluation according to the agreed upon evaluation plan. However, several limitations are worth noting.

- **Programme maturity and community perspective:** Due in large part to delays resulting from COVID-19 restrictions, the programme has not yet reached the level of maturity that was anticipated during programme design and early implementation. Consequently, it is too early to accurately assess several result areas, as the programme has simply not evolved to the point where these changes are observable. This limited the ability of the evaluation team to assess medium to long-term outcomes and thus limited the assessment of programme impact. The evaluation team nevertheless endeavoured to identify directionality of change and sought to assess the likelihood of results based on informant perceptions.
- Partly due to the level of programme maturity (as well as due to logistical and time constraints), the evaluation team did not visit project sites beyond Ambon, nor did it engage with target communities. This does not pose a major limitation, however, because as mentioned above, the programme has not yet progressed to the point where community-level change is expected.
- **Baseline not reflective of programme:** The baseline assessment carried out during early implementation no longer provides a valid basis for measuring the achievement of programme results. This is due to several factors, the most significant being a change in the programme's geographical scope which rendered the sample frame and approach inadequate. The usefulness of the baseline for the evaluation was further constrained by not being tightly focussed on the programme outcomes and indicators identified in the Monitoring and Evaluation (M&E) Framework. As a result, the evaluation relied heavily on qualitative data collection and analysis approaches, which centre stakeholder perceptions of programme benefits and changes. Triangulation of data was used extensively to ensure key claims were verified using multiple data sources wherever possible.
- **Staff turnover within stakeholder organisations:** NZMATES' partner institutions experience frequent staff turnover and as a result informants consulted for this evaluation did not always have a comprehensive understanding of the programme and their organisations' history working in partnership with NZMATES. To ensure important learning was not missed, the evaluation team carried out a thorough document review (facilitated by excellent record-keeping by the NZMATES team) and sought to engage stakeholders from a range of positions within partner organisations wherever possible. This ensured informants with a range of knowledge and experience of NZMATES were included.
- Finally, it's worth noting that while the evaluation contains both summative (backward looking) and formative (forward looking) analysis, the formative elements are not a substitute for a full activity design. Should MFAT decide to pursue a new programme phase, the recommendations and areas identified here for future consideration are best explored in-depth as a part of a full activity design process.

3. Relevance and alignment

This section evaluates the degree to which the programme objectives and design align with the strategies and priorities of Indonesia and New Zealand, and address the needs of communities in Maluku Province. It monitors changes to key strategies and policies that have occurred during the programme's lifespan and assesses its ongoing suitability.

Key evaluation questions:

- To what extent is NZMATES relevant to New Zealand's bilateral and development priorities?
- To what extent is NZMATES relevant to Indonesia's renewable energy and development priorities?
- To what extent is NZMATES relevant to local communities?

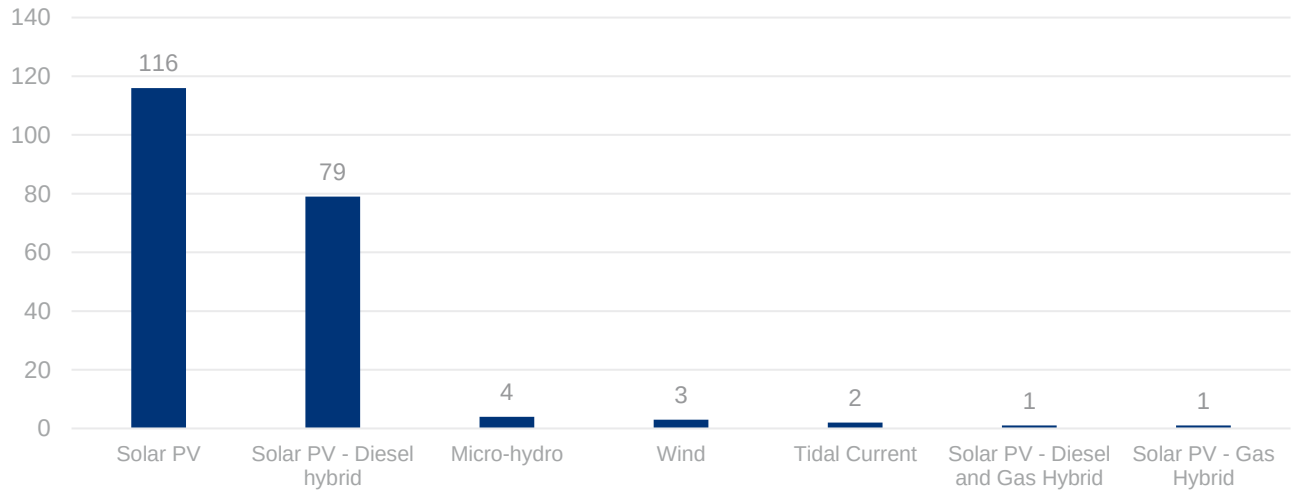
3.1 Relevance to Indonesia's policies, strategies and needs

The intent and design of NZMATES is aligned to the priorities of the Government of Indonesia (GoI) and its plans in Maluku province. Through its national plans and policies, including the Medium-Term National Development Plan 2020-2024[2] (RPJMN) and the National Energy Policy[3] (NEP), it is clear that the Government of Indonesia aims to increase its investments in new and renewable energy. Issued in 2014, the NEP aims to achieve a national primary energy mix with a minimum contribution of 23 per cent from new and renewable energy by 2025 rising to 31 per cent by 2050. The NEP is currently being revised and is now expected to aim for a target of 70-72 per cent renewable energy by 2060 to achieve Indonesia's Net Zero emission target.

The Electricity Supply Business Plan (RUPTL) 2021-2030 aims to ensure that the majority of power generation projects to be developed are renewable energy projects. The RUPTL has set a target of 51.6 per cent of 40,575 MW to be from renewable energy, an increase of 25 per cent from the previous RUPTL. According to its design, NZMATES' objectives seek to support the enhancement of access and uptake of renewable energy in the Maluku province through its technical support, capacity building initiatives, and partnership with local public and private sector renewable energy actors.

NZMATES' solar power projects support the GoI's plans to enhance solar power infrastructure in the eastern region. NZMATES receives Solar Power Plant Planning (PLTS) project requests and supports the development of these projects to 'funding-ready' status, contributing to RPJMN's plans to increase the capacity of renewable energy generations from 10.2 GW to 19.2 GW in 2024 and its plans to increase solar PV substantially in the country by 2030. Since its inception, NZMATES has received and assessed 66 PLTS projects across 11 regencies in Maluku province. Figure 2 shows the number of projects that have entered the NZMATES Pipeline, sorted by renewable energy source. The majority of these projects are solar PV or hybrids of solar and fossil fuel energy sources.

Figure 2: Number of NZMATES projects in the pipeline by type of renewable energy source



[2] Medium-Term National Development Plan 2020-2024. https://leap.unep.org/en/countries/id/national-legislation/medium-term-national-development-plan-2020-2024

[3] Government regulation of the Republic of Indonesia Number 79 of 2014 on National Energy Policy. https://policy.asiapacificenergy.org/sites/default/files/Government%20Regulation%20No.%2079%3A2014%20of%202014%20%28EN%29.pdf

The NEP is currently being revised, but stakeholders are confident that NZMATES will remain relevant to the revised priorities and targets proposed. The NEP was enacted in 2014 to increase Indonesia's energy independence by transitioning its energy resources from export to the domestic market and thereby rebalancing the energy mix towards indigenous energy supplies. As such, the GoI's investments in energy will focus on "improving energy conservation and energy efficiency, minimising oil consumption, increasing the exploitation and consumption of renewables, securing and balancing energy with coal, as well as optimising gas production and consumption, and consideration of nuclear energy as option of last resort"[4].

While the NEP is set to be revised in 2025, consultations with NZMATES stakeholders indicate that the programme will continue to be closely aligned to the priorities of the GoI and the plans and policies of its related agencies. According to stakeholders, the revised NEP will continue to focus on renewable energy while adjusting the timelines to achieve energy targets. Priorities within the revised NEP are expected to include:

- Maintain security of supply and affordability of prices during the transition
- Improve energy conservation and energy efficiency
- Maximising renewable energy
- Minimising the use of fossil fuels (coal and gasoline)
- Optimise the use of gas, as a transition intermediary
- Use of new (nuclear) energy to achieve decarbonisation targets

3.2 Relevance to New Zealand's bilateral and development priorities

NZMATES is aligned with MFAT's development priorities and principles and supports New Zealand's use of renewable energy expertise to raise New Zealand's profile as a partner of choice in the energy sector. As presented in Table 2, the programme's investments and tasks are aligned to New Zealand's ICSED principles, particularly through its contributions to renewable energy activities which support greenhouse gas emission reductions and climate change mitigation efforts. NZMATES seeks to support renewable energy development in Maluku, to reduce import fuel costs, and contribute indirectly to enhancing trade and economic partnerships between GoI and GNZ. As such, the programme is relevant and aligned to MFAT's ASEAN 4-Year Plan and the Indonesia-New Zealand Comprehensive Partnership (2020-2024).

NZMATES also provides an opportunity to showcase New Zealand's commitment to addressing environmental and climate change challenges in the region through seeking to reduce greenhouse gas emissions by contributing to the transition away from fossil fuel, as diesel currently makes up the dominant source of energy produced in the area.

Table 2: NZMATES programme alignment to related GNZ policies and plans

Related GNZ Policy/Plan/Strategy	Aligned?	Key areas of alignment
Joint Commitment for Development (2017-2024)	Yes	Renewable energy is one of four priorities between GNZ and GoI. Focused on increasing equitable access, renewable energy production, and workforce skills and capability in renewable energy. Identifies Maluku Province as a geographical priority area.
Indonesia-New Zealand Comprehensive Partnership (2020-2024)	Yes	Support the development of renewable energy to enhance trade and economic partnership between GoI and GNZ.
ASEAN 4YP	Yes	Support renewable energy development to reduce import fuel costs, increase economic resilience, and lower emissions (priority area in first strategic goal). Support the transition away from fossil fuel use.
International Cooperation for Effective Sustainable Development (ICESD)	Yes	Will reduce greenhouse gas emissions and subsequently address climate change. Demonstrates New Zealand's value for real progress in environmental challenges. Indonesia is a part of the Southeast Asian region, a secondary geographic focus for New Zealand's ODA.

[4] Climate Policy Database. Available at: National Energy Policy (Government Regulation No. 79/14) | Climate Policy Database

4. Governance and efficiency

This section explores NZMATES governance arrangements from the perspective of both its appropriateness and efficiency. It examines the degree to which governance arrangements have supported or hindered results and assesses the suitability of NZMATES approach for maximising programme efficiency.

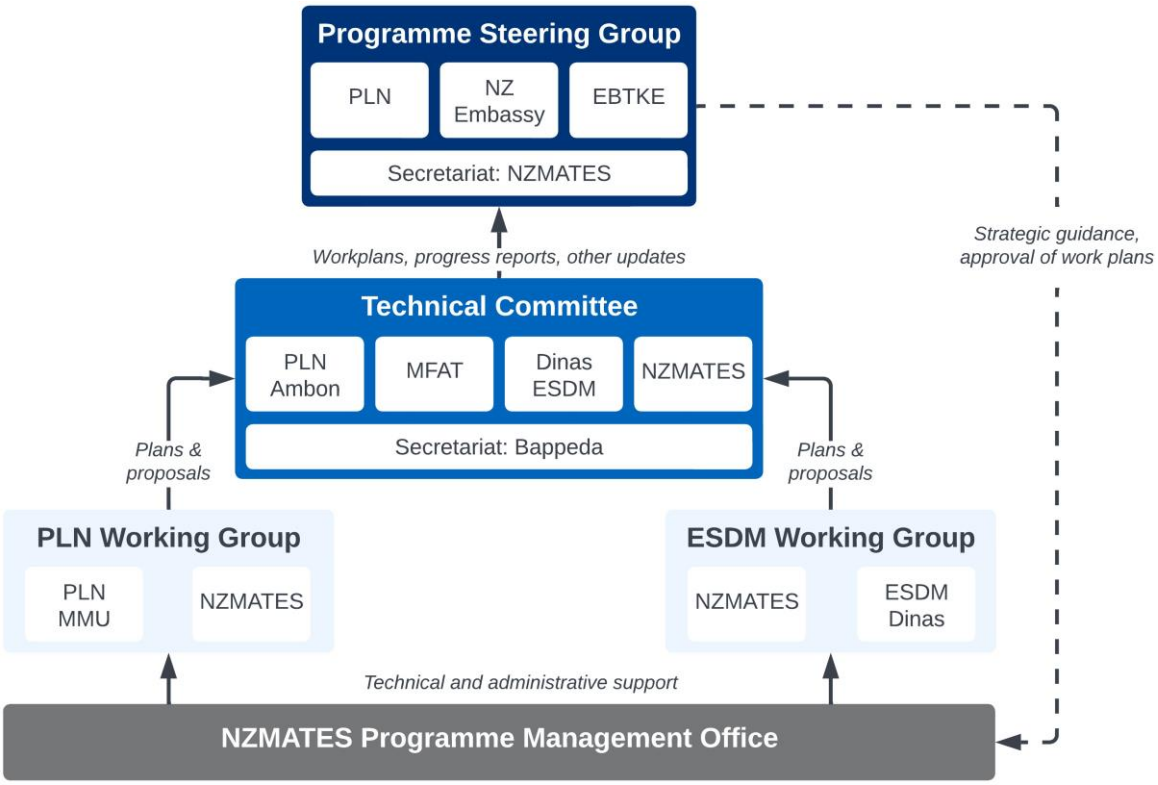
Key evaluation question:

- To what extent are governance and management arrangements adequately organised and operationalised to support the achievement of intended results

4.1 NZMATES governance

The NMZATES governance and management structure operates at three levels: national, regional and institutional.

Figure 3: NZMATES governance and management structure



At the national level the **Programme Steering Group (PSG**) is responsible for overall programme governance and oversight, and providing strategic direction, including review and approval of NZMATES six-monthly work plans and its results framework. The PSG consists of representatives from the NZ Embassy, the EBTKE and PLN, with NZMATES acting as secretariat. Each member of the PSG has veto rights, ensuring consensus is reached on key decisions.

The PSG meets at approximately six-monthly intervals and has been convened a total of eight times since its inaugural meeting in May 2019.

The **Technical Committee (TC)** is used to develop six-monthly work plans (for approval by the PSG) and coordinate efforts to progress renewable energy projects at the provincial level. It consists of representatives from NZMATES, MFAT, PLN Wilayah Maluku and Maluku Utara (PLN-MMU) and Dinas ESDM. The Regional Planning Agency (Bappeda) also contributes through provision of secretariat support. The Technical Committee met a total of nine times between March 2019 and June 2023.

To identify support needs, work priorities and potential sites for renewable energy projects, the programme has established **working groups** within its primary partner agencies in Maluku, PLN and ESDM. The working groups meet on an ad hoc/as-needed basis.

Underlying this structure, programme implementation is managed by New Zealand renewable energy company, Infratec in partnership with Mercy Corps Indonesia (MCI).

4.2 Appropriateness of governance structure

The governance and management structure appears to be working as intended. All stakeholders consulted as a part of the evaluation suggest that governance arrangements include the stakeholders necessary for effective coordination of renewable energy projects in Maluku and are functioning well, with suitable levels of commitment shown by all partners. This is especially true at the provincial level where NZMATES' presence in Ambon and the relationships fostered in Maluku are widely considered to be critical success factors underpinning the NZMATES model.

Informants with inside knowledge of NZMATES partnerships commended the work carried out to build these relationships and confirmed the achievement of a key programme objective – the establishment of effective platforms for renewable energy initiatives among local government, industry players and education institutions with NZ and other donors.

Challenges and weak points: Despite the overwhelmingly positive assessments of NZMATES governance arrangements offered during consultations, challenges and potential weak points were also acknowledged. These relate to:

- Inherent difficulties working with large bureaucratic organisations, such as responsibilities for decision-making becoming fragmented and the logic of internal incentives distorting choices away from agreed upon plans and activities. An example of this is the perception among several respondents that the metrics used to assess performance within key agencies (e.g., for staff members and organisational units) do not always match agreed upon plans, resulting in decisions that may contradict prior agreements.
- Internal changes within partner organisations (e.g., structural reforms) creating continuity challenges and delays.
- Staff turnover within partner organisations causing a loss of institutional memory, creating regular shifts in priorities and requiring a continual cycle of establishing and reestablishing relationships.
- The risk that partnering with PLN will further consolidate its power and exacerbate anti-competitive dynamics in the renewable energy space.
- Limited renewable energy knowledge and capacity. While this is something the programme is actively aiming to address, it nonetheless hinders progress.

None of these are considered critical challenges to NZMATES governance, coordination, or management, but they do reinforce the need for continued flexibility and the importance of staying abreast of developments within partner institutions through continuing to invest in strong relationships. NZMATES has repeatedly demonstrated a capacity for both throughout programme implementation.

4.3 Programme efficiency

NZMATES seeks to leverage other actors to achieve outsized influence. In the Indonesian context, NZMATES represents a relatively modest investment in renewable energy. This, respondents argue, has compelled the programme to carve out a very specific niche and to seek to establish ways of working that leverage other actors to achieve shared objectives in the renewable energy space. As such, NZMATES is designed to act as an enabler and facilitator of renewable energy projects, an approach that several respondents suggest has the potential to achieve outsized influence. This is particularly true when compared to a counterfactual in which funding is instead provided directly for infrastructure construction.

The NZMATES model works simultaneously to build capacity among key organisations responsible for advancing the GoI's National Energy Policy objectives in Maluku, while bringing key actors together to advance planning and coordination, and guiding potential projects through the necessary pre-implementation steps to achieve funding. Assuming this model works (something that is explored in detail in the following section), it represents an extremely efficient model for promoting long-term renewable energy development and is one that is commensurate to both the scale of MFAT's NZMATES investment as well as its intent.

NZMATES operational presence at the provincial level offers unique value. NZMATES is differentiated from other renewable energy programmes considered in this evaluation by its physical location in the province and its provincial level focus. Respondents uniformly highlighted this as key to the NZMATES approach with several suggesting this enables a relatively small investment to make a significant difference.

> ***"It's really quite unique. Whether by good design or good luck they have found a solid value proposition"***
>
> **- Representative from non-MFAT renewable energy programme**

The programme footprint in Maluku has enabled NZMATES staff to build strong and valued relationships with a range of stakeholders and develop an in-depth and nuanced understanding of the context that would be difficult to achieve without a consistent presence in Maluku.

While learning and experiences from NZMATES provincial level engagement are fed back to the national level through the PSG, several Jakarta-based respondents suggested NZMATES could offer greater value at the national level by sharing lessons and experiences more widely. This is not to suggest that NZMATES does not engage with similar programmes (all interviewees from other renewable energy programmes had experienced some engagement with NZMATES), it is rather a reflection of the perceived uniqueness and value of the NZMATES standpoint.

Increased efficiency through investing in local capacity and ownership. During its early years, NZMATES experienced frequent turnover of technical staff who, since their specific expertise was not available in Maluku, were brought into the programme from outside the province but ultimately elected not to stay. This turnover delayed progress and inhibited programme efficiency. As a result, the programme pivoted to a strategy aimed at fostering skills development of staff already based in Maluku through the introduction of internal staff training opportunities and an internship programme. Initial impressions from internal NZMATES respondents suggest that the approach is showing considerable promise, offering potential benefits in terms of both programme continuity and efficiency.

Building greater local capacity within the Maluku-based team is also consistent with principles underlying the partnership between MCI and Infratec. From Infratec's perspective, an explicit objective of this partnership is to progressively transfer technical responsibilities to MCI. COVID-19 and restrictions on Infratec's capacity for in country engagement has accelerated the timeline for this transfer.

Photo: Supervision monitoring of ESDM Office rooftop solar project. Source: NZMATES

5. Effectiveness and impact

Key evaluation question:

- To what extent has NZMATES made progress towards its intended outcomes?

This section assesses effectiveness by analysing progress made towards the achievement of results outlined to the NZMATES programme logic. It does so by examining in detail the three primary areas of programme engagement (the Programme Platform and Framework, capacity development support and technical assistance in the project pipeline). It does so by assessing their contributions to change in three primary areas: (i) improved collaboration and enabling environment; (ii) strengthened renewable energy capability among key partners; and (iii) implemented and operational renewable energy projects. Together these results are necessary for NZMATES to achieve its long-term objectives.

5.1 Improved collaboration and enabling environment

The initial means through which NZMATES aims to improve the enabling environment and promote better collaboration to support renewable energy development in Maluku is through the establishment and operation of the 'Programme Platform' and 'Programme Framework'.

The **Programme Platform** refers to the NZMATES office and programme team[5] together with the NZMATES governance and management structure (see Section 4 for details of governance structure). The Programme Platform has been fully functional since 2019, with the office, staffing and operating policies established in 2018 and the governance structure operating since the inaugural meeting of the Programme Steering Group in May 2019.

The office in Ambon is currently staffed by 16 people, with one position split 50 per cent between Ambon and Jakarta to support coordination at the national level and one full-time position based in the Infratec office in Wellington. NZMATES has achieved a good gender balance with eight female staff members including two in senior managerial and advisory positions. Consistent with the MFAT development principle of inclusion the programme has two staff dedicated to stakeholder engagement and two dedicated to community engagement. Six positions are for specialist technical roles.

Programme Framework: The effectiveness of the Programme Platform is contingent upon a comprehensive understanding of the renewable energy context in Maluku. NZMATES has therefore developed a suite of supporting analyses and documentation designed to ground the programme in the relevant institutional, technical, socio-cultural, regulatory, and commercial realities of the national and provincial renewable energy context. This consists of three main parts: an **institutional framework**, a **technical framework** and a **funding and financing catalogue**.

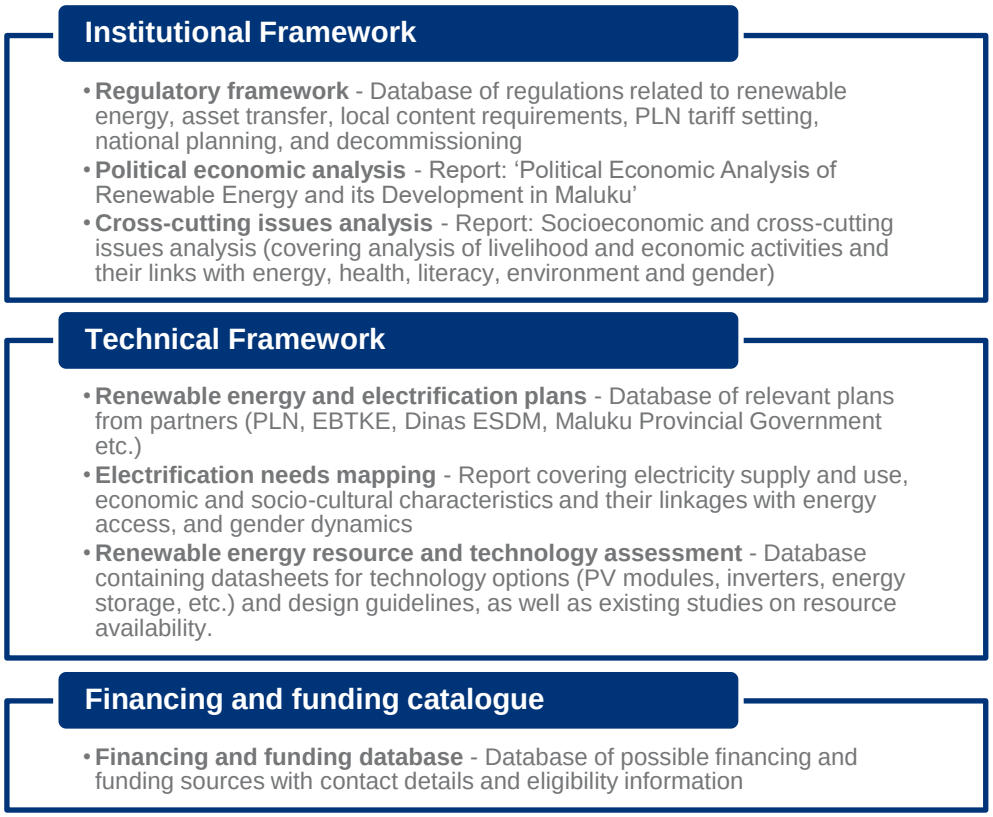
This 'Programme Framework' underpins the programme team's approach to stakeholder engagement and is used to develop the tools and methodologies for the provision of technical assistance and capacity strengthening support. In keeping with the ICESD development principle on inclusion, the programme recently commissioned research to explore the role of women in the renewable energy sector[6] . It is envisaged that this will bolster the Programme Framework and serve as a reference for stakeholders for gender mainstreaming in the renewable energy sector in Maluku.

See Figure 4 for an overview of the NZMATES Programme Framework and its constituent parts.

[5] Including the policies and procedures necessary for effective delivery, such as the Implementation Plan, Monitoring and Evaluation Plan, Communications and Stakeholder Engagement Strategy, Health, Safety and Security Plan and Standard Operating Procedures for key tasks/activities such as travel.

[6] Research Report on the Role and Participation of Women in the Energy Sector Renewable in Maluku Province. https://nzmates.org/sites/default/files/2023-08/FINAL-Research%20Report%20%20Women%20%26%20Renewable_signed.pdf

Figure 4: The NZMATES programme framework



The Programme Platform and Framework is contributing to an improved enabling environment and collaboration in Maluku. Stakeholders consulted at the provincial level expressed unanimous support for the NZMATES Platform and Framework, with several indicating that NZMATES had become the 'go to' hub for expertise on renewable energy in Maluku Province. In an environment where coordination between the major renewable energy actors is often challenging and stakeholders tend to operate in silos, NZMATES appears to have positioned itself as a useful intermediary.

Evidence that this engagement is valued was demonstrated during several consultations. EBTKE, for example, expressed an interest in greater involvement with NZMATES at the provincial level through participation in the Technical Committee in addition to its role in the PSG. Similarly, the Global Green Growth Institute (GGGI) highlighted the value of NZMATES work at the provincial level, indicating that it had directly copied the NZMATES coordination approach when establishing energy forums in Papua Province.

> ***Through discussion with NZMATES we decided to copy their approach, establishing energy forums in Papua, creating a platform also for private sector to join".***
>
> **- Representative from development agency**

NZMATES has Memoranda of Understandings (MoU) with the Provincial Government and cooperation agreements with the Regional Planning Agency (Bappeda) and Dinas ESDM in Maluku. As PLN has a more vertical management structure and decisions are centralised in Jakarta, there is no formal agreement with the PLN Office for Maluku and North Maluku (PLN MMU).

Among respondents from this group, all requested that the programme continue and each highlighted areas of capacity development and technical assistance that have benefited their organisations (see subsequent section for detail on capacity development support and technical assistance). NZMATES also has MoUs with the University of Pattimura and Ambon State Polytechnic. These are discussed in section 5.3 below.

While the programme focusses principally on the provincial level, engagement at the national level is also important. Interviewees at the national level were encouraging of the NZMATES Platform and Framework, with all respondents suggesting it should continue.

The PSG is the only formal mechanism for engagement at the national level and is widely considered to be critical for programme legitimacy. However, engagement with PSG members is not limited to the PSG, with separate meetings occurring on a regular, albeit ad hoc and as needed basis. Respondents view ad hoc engagement as equally necessary for programme effectiveness, particularly in the case of PLN due to its centralised decision-making structure.

NZMATES engages with peer programmes working at the national level and in several instances has drawn on these relationships to collaborate on shared goals. Examples are facilitating training of NZMATES stakeholders through the Swiss Renewable Energy Skills Development programme (RESD) programme and partnering with the UK's Progress Towards a Low Carbon Energy Transition in Indonesia programme (MENTARI) to try to match potential projects supported by NZMATES with funding opportunities. Interviewees from peer programmes such as these expressed support for NZMATES and respected their engagement with the programme.

Finally, at the national level NZMATES has also engaged with funding and financing bodies in an attempt to identify financial support for 'funding ready' projects. These efforts are discussed in section 5.2 below.

Table 3: Collaboration and enabling environment – assessment summary

Result	Assessment summary	Status
NZMATES programme platform operating	The Programme Platform consists of the NZMATES office and programme team, the policies and procedures necessary for delivery, and the NZMATES governance and management structure. The office, staffing and policies were in place within 2018, while the governance structure was in place and operational by May 2019. Policies and procedures are reviewed annually and updated as necessary.	Very strong evidence of achievement
NZMATES programme framework mapped and updated	The programme framework consists of the an Institutional Framework, Technical Framework, and Financing and Funding catalogue. Work commenced in 2018 and the framework was fully established by 2019. The framework components continue to be updated as new information becomes available.	Very strong evidence of achievement
Platforms for RE initiatives established by or between local government actors, education institutions and industry players in partnership with NZ and other donors	NZMATES has estalblished platforms for engament with a range of stakeholders, including national and provincial governments, tertiary education institutions, peer development programmes and funding and financing institutions. Primary formal engament platforms are the PSG (8 meetings) and TC (9 meetings).	Very strong evidence of achievement
Improved collaborations and enabling environment to support RE in Maluku	NZMATES has facilitated greater collaboration and engagement between key governmental actors in the renewable energy space in Maluku. At a minimm, NZMATES engagment has paving the way for accelerated e renewable energy space.	Strong evidence of achievement

5.2 Implemented and operational renewable energy projects

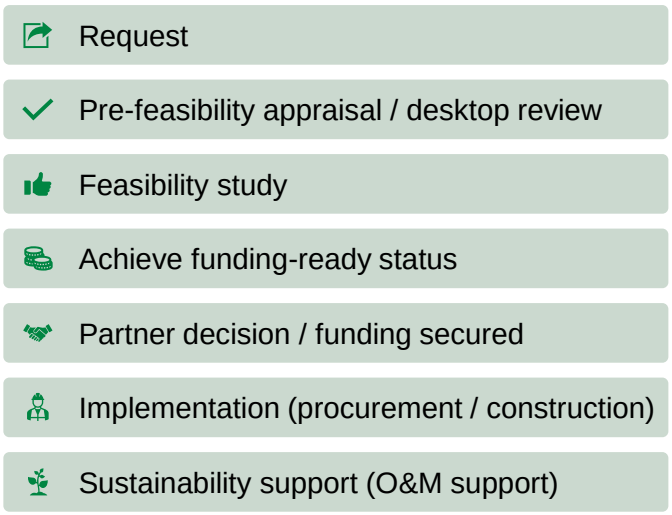
Key to the NZMATES model is its work in guiding potential projects through the necessary steps to achieving 'funding ready' status, and ultimately whether these then go on to receive funding and become operational renewable energy plants. As this is the only component that translates directly into renewable energy production, it is considered vital to NZMATES success.

The project pipeline: Potential projects enter the pipeline by way of a site request from one of the programme's key partners. These are usually identified via working groups that operate with PLN and Dinas ESDM in Maluku or at the national level from members of the PSG.

Once a site request is received it is taken through pre-feasibility appraisal which assesses the energy source and technological solution and acts as an initial review to determine whether a full feasibility study is appropriate.

The feasibility study stage is multifaceted and includes due diligence, environmental assessment, socio-economic assessment, technical asset assessment, Levelized Cost of Electricity assessment and land clearance. Once a project has gone through these necessary steps, and if it is then deemed to be feasible, it is considered 'funding ready'.

Figure 5: Project pipeline steps



NZMATES seeks to identify or facilitate funding by communicating and building relationships with funding and financing bodies based on its funding and financing catalogue. If a project is successful in attracting funding, NZMATES may then provide further technical assistance to help oversee procurement and construction and eventually sustainability support (O&M support).

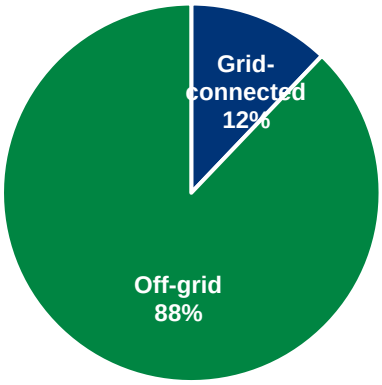
Project pipeline activities are also used as opportunity to build capacity of key stakeholders by using partnering and mentoring approaches to delivery. This is discussed more in Section 5.3.

A significant majority of sites in the pipeline are for off-grid projects rather than grid-connected (88 percent) and the majority are for solar (58 percent) or solar diesel or gas hybrid (37 percent).

This marks a shift from the original investment design which envisaged a higher proportion of hydro and biomass in addition to solar, and a much more significant role for grid-connected projects.

This deviation reflects the broadening of the programme's geographical focus from Seram Island to the wider Maluku province.

Project sites by grid connection (N = 201)

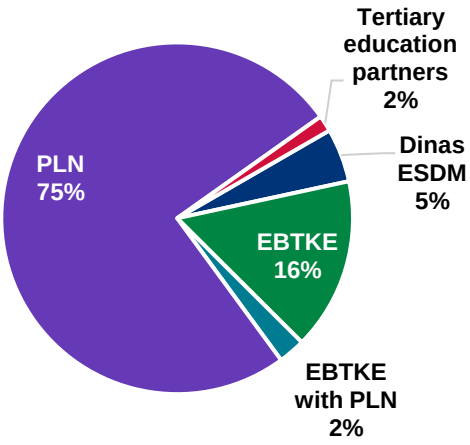


Analysis of site requests illustrates the central role of PLN in the pipeline, with 75 per cent of requests coming via PLN compared with 16 per cent from EBTKE and 5 per cent from Dinas ESDM.

Project pipeline progress: Not including seven rooftop solar project sites that follow a somewhat different logic to that of the standard pipeline, NZMATES received a total of 201 site requests throughout the life of the programme. As shown in Figure 6, of these 97 per cent were appraised, 58 per cent reached feasibility study stage, and 11 per cent achieved 'funding ready' status.

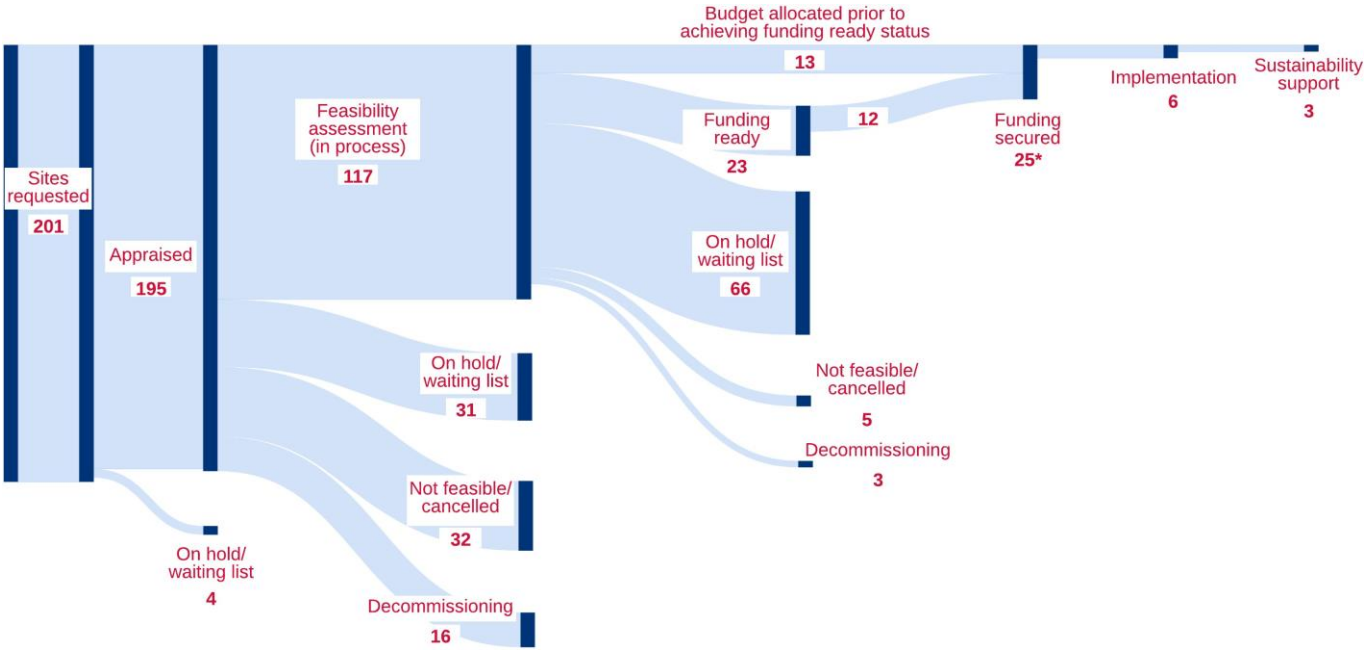
While 12 per cent of projects went on to secure a funding agreement, less than half of these did so after achieving 'funding ready' status and instead secured funding based on the initial appraisal and before feasibility assessment was complete.

Project sites by requesting partner (N = 201)



A total of 2.9 per cent of projects have reached implementation stage, two of which are funded by NZMATES, leaving just 1.9 per cent of projects that have secured independent funding and gone on to implementation.

Figure 6: Project pipeline progress



The assumption that pipeline activities will unlock project funding is yet to be validated. A key assumption underpinning the NZMATES approach is that the pre-implementation steps in the pipeline facilitated by NZMATES will pave the way for funding by proving the commercial and technical viability of potential projects. However, progress to date neither proves nor disproves this assumption as insufficient time has passed to fully assess whether an appropriate proportion of projects successfully attract funding.

While the 1.9 per cent success rate of projects securing independent funding and progressing to implementation would likely be considered underperformance in a more mature pipeline, the perception among most stakeholders with insight into pipeline activities is that more time is needed to see results. This is due in large part to COVID-19 and delays to the programme due to remote working arrangements, loss of key staff and inability to travel and carry out face-to-face meetings.

Nevertheless, project funding clearly presents a critical risk to the NZMATES model. This is a point noted by ESDM during development of the original investment design, when it expressed concern about the programmes "lack of funding for installation, and a desire to avoid funding only for studies and reports"[7].

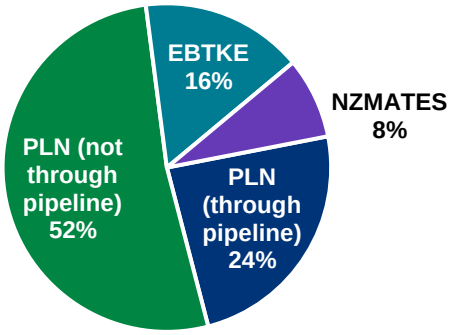
Several interviewees highlighted the challenges in securing funding for NZMATES projects, primarily due to their scale and the lower energy demand in Maluku's small island locations, resulting in a diminished Return on Investment (ROI). In response, the NZMATES team has initiated a strategy of bundling similar projects within specific geographical areas. This approach aims to enhance their commercial appeal.

However, recognising the critical importance of securing funding, some respondents recommended that NZMATES intensify its efforts to facilitate funding, particularly from private sources. The question of whether NZMATES currently possesses adequate staff capacity for attracting funding remains inconclusive, suggesting an area for potential improvement.

Of the 25 projects that have received a funding agreement, 76 per cent (19) are from PLN. However, more than half of these (13) were committed to without going through the full NZMATES pipeline, raising questions about the extent to which it is pipeline activities that facilitate funding or something else. The decision to fund these 13 projects without completing pipeline activities appears to have been made by PLN centrally according to an internal rationale based on pre-feasibility desk studies alone. NZMATES is continuing to support these projects through full feasibility study, and although this has not been necessary to achieve funding is expected to benefit these projects through increased quality of design and implementation.

The remaining funding commitments come from EBTKE (six projects) and from MFAT via the NZMATES discretionary budget (two projects).

Projects with funding agreements by funding sources (N = 25)



NZMATES has reached beyond the programme's primary partners in an attempt to match funding ready projects with funding and financing bodies. Most notable is an agreement with the ADB to fund refurbishment of seven solar plants which fell through after PLN was unable or unwilling to take on assets, and a concept note making its way through the application process with the Global Climate Fund (GCF) supported by PT Sarana Multi Infrastruktur (PT SMI).

Most interviewees with insight into the funding environment expressed optimism that many projects will eventually find funding. However, several suggested that greater financial commitment from the GoI was needed if more projects were to come to fruition.

With only a small number of projects reaching implementation stage, the composition of the project pipeline appears skewed towards early-stage activities. After COVID-19 restricted travel and in-person consultations, the programme pivoted from full pipeline activities towards desktop research and analysis, distorting the composition of the pipeline towards the pre-feasibility stage.

While this was an appropriate choice given the circumstances, it highlights the need for more thinking around what an appropriate balance between different stages in the pipeline should look like under optimal circumstances. There is little point, for example, in continuing to appraise projects and carry out feasibility studies if a reasonable proportion of these do not go on to receive funding and begin implementation.

Use of NZMATES discretionary budget has created challenges with asset transfer. NZMATES is based on a government-to-government agreement through EBTKE. As such, it falls under national regulations that require assets to be transferred to the signatory government partner upon its conclusion. This means assets cannot be transferred to PLN or other non-government partners even if they are the intended asset owners.

At the time of investment design, it was envisaged that NZMATES would not fund or produce assets except as a last resort" [8]. As such, potential issues related to asset transfer appear to have not been widely considered. To better support capacity building efforts through the establishment of demonstration sites, and to address budget underspend, NZMATES submitted a request to use its discretionary budget for building the mini-grid solar

[7] Activity Design Document: New Zealand-Maluku Access to Energy Support, 2017, pp. 6

[8] See Activity Design Document: New Zealand-Maluku Access to Energy Support, 2017, pp. 6. "… *capital contributions from the discretionary budget may be allowed as a last resort, and will be considered on a case-by-case basis".*

laboratory at Unpatti and a solar PV plant on Palau Tiga. These were accepted by the PSG and MFAT, introducing unintended challenges related to asset transfer.

Upon conclusion of the agreement, the solar laboratory must be handed to EBTKE who can neither easily take possession of it (as it is based at the university) nor pass it on. Despite being a state-owned enterprise, the same is true for asset transfer to PLN.

While it is beyond the scope of the evaluation to explore this issue in detail, some respondents suggested that the issue could be addressed in the future by including a waiver or Partnership Operation Agreement within the overarching agreement that specifies who will take ownership of assets upon completion. Another suggestion was to include arrangements for transfer of assets to government at the village level through Village-Owned Enterprises (BUMDes).

The issue of asset transfer is being followed up closely by the NZMATES team and PSG members and different options are actively being explored. The expected time it will take to resolve this challenge is cited by some stakeholders as a reason for extending the programme partnership agreement until December 2025.

Table 4: Implemented and operational renewable energy projects – assessment summary

Output	Assessment summary	Status
Renewable energy projects progress smoothly through the project pipeline	NZMATES received a total of 201 site requests throughout the life of the programme. Of these 97 per cent were appraised, 58 per cent reached feasibility study stage, and 11 per cent achieved 'funding ready' status	Strong evidence of achievement
Renewable energy projects are funding and implementation ready	NZMATES received a total of 201 site requests throughout the life of the programme. Of these 97 per cent were appraised, 58 per cent reached feasibility study stage, and 11 per cent achieved 'funding ready' status	Strong evidence of achievement
Renewable energy projects secure funding	While 12 per cent of projects went on to secure a funding agreement, less than half of these did so after achieving 'funding ready' status and instead secured funding based on the initial appraisal and before feasibility assessment was complete.	Some evidence of achievement
Renewable energy projects implemented and operational	Only three projects have gone on to implementation and become operational. Of these one is funded by NZMATES and the remaing two are small-scale rooftop projects.	Weak evidence of achievement

5.3 Strengthened renewable energy capability

Building on the Programme Platform and Framework, the second key pillar of NZMATES is to improve capacity for renewable energy development in Maluku.

Capacity strengthening activities are informed by the institutional and technical frameworks within the Programme Framework and are supplemented by skill gaps analyses carried out with primary programme partners in Maluku (PLN and Dinas ESDM).

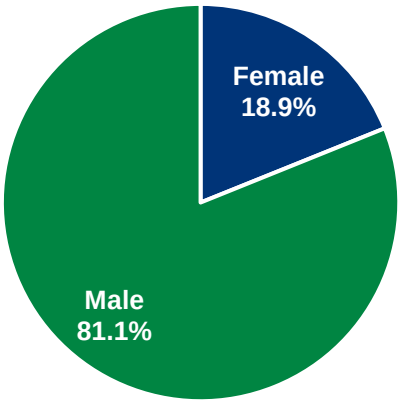
Capacity building activities fall into three main areas:

- **Training** by NZMATES staff and Infratec consultants to internal and external stakeholders.
- **Partnering** with education providers and other renewable energy programmes to offer or develop renewable energy training and research opportunities.
- **Mentoring** of programme partners to advance renewable energy planning and build technical skills to manage project pipeline activities.

These activities are supplemented by a suite of guidance materials and tools developed and disseminated through the programme.

NZMATES training is improving knowledge of renewable energy in Maluku and accelerating progress of renewable energy activities. NZMATES has conducted 28 distinct training activities covering a total of 550 individuals (104 female, 446 male). Trainings target the programme's primary government, industry and education partners in Maluku (primarily, PLN, Dinas ESDM, Unpatti, Ambon Polytechnic). Trainings cover a range of topics, including operations and maintenance (O&M), asset management, key software such as Low Emissions Analysis Platform (LEAP), Hybrid Optimisation of Multiple Energy Resources (HOMER), and System Advisor Model (SAM), health, safety and security, site surveying, project lifecycle costs and training of trainers.

Trainees by sex (N = 550)



Performance of trainings is monitored through a combination of satisfaction surveys, reflection workshops, stories of change, and where feasible, pre and post training testing.

Together these indicate that trainings are generally perceived as useful and effective by participants and are valued by the programme's primary partners.

Interviewees with knowledge or experience of NZMATES capacity building activities corroborate this finding, indicating that capacity building support has contributed to achievement of the key programme outcome of improved understanding of renewable energy and accelerated the progress of renewable energy activities.

The use of demonstration sites is highlighted as particularly useful with the Pūngao Pattimura Mini-Grid Training Laboratory at Unpatti offering valued hands-on training that would be difficult to achieve in its absence. The development of solar power plant at Palau Tiga is viewed as an opportunity to take the principle of 'hands-on training' to the next level through training during implementation and for O&M.

NZMATES has established valued partnerships with education providers to enhance instruction and research on renewable energy. Based on MoUs with the University of Pattimura (Unpatti) and Ambon Polytechnic, NZMATES is helping develop renewable energy training courses and embed renewable energy in long-term training programmes. This work is most advanced with Unpatti, with NZMATES having trained trainers, developed a draft curriculum, and constructed a mini-grid training laboratory. At Ambon Polytechnic NZMATES is supporting plans to establish a renewable energy engineering study programme and has entered into an agreement with the Polytechnic to install solar power and mini hydro demonstration laboratories.

Both partnerships show considerable promise but will require further support if they are to realise their full potential. For the Polytechnic, additional support has been requested to develop their curriculum and funding for the programme remains a challenge. For Unpatti, the potential to become a registered professional certification institution would greatly enhance the status of courses, enabling them to be used for professional certification. On this point, the Centre for Development of Human Resources (PPSDM) within EBTKE has expressed interest in using the laboratory as a training hub for professional certification of public sector employees working on renewable energy in the Eastern region, something that would fortify the renewable energy programme in the university and provide considerable efficiency gains as training is certification currently takes place in Jakarta.

> ***"Provision of facilities like solar lab also aims at establishing Unpatti to become a professional certification institution. The Ministry of Energy and Mineral Resources has assessed the feasibility of the training centre and the laboratory to become a professional certification centre, and has confirmed Unpatti's eligibility".***
>
> **- NZMATES stakeholder**

In addition to partnerships with Maluku-based education providers, NZMATES has also facilitated a partnership between Victoria University of Wellington and Indonesia's National Research and Innovation Agency (BRIN) to conduct research into tidal current energy in the province and has partnered with peer renewable energy programmes to provide training opportunities to Maluku-based stakeholders. These partnerships are viewed positively by stakeholders, with several suggesting partnerships could be further strengthened.

Mentoring carried out to enhance planning in conjunction with project pipeline activities offers practical hands-on skills development for partner organisations. NZMATES provides technical assistance across a range of areas to improve planning and guide potential projects through a pipeline from pre-feasibility assessment to sustainability support (O&M support). NZMATES has ensured knowledge and skills transfer is integrated into this work by bringing counterparts from PLN and Dinas ESDM into the process and involving them in the development of key outputs. This includes, energy planning, project appraisal, feasibility studies, project implementation, operations and management, waste management and decommissioning.

For Dinas ESDM, the most significant mentoring support received by NZMATES has been helping to develop the General Provincial Energy Plan (RUED). Work began on the RUED in 2018 but stalled as Dinas ESDM lacked the necessary technical capacity to reach completion. With NZMATES guidance this was finalised in 2022. Since the RUED serves as the roadmap for electrification in Maluku until 2050, this is considered a major achievement.

Interviewees from PLN also spoke very positively of the support received from NZMATES stating that without NZMATES, more time and resources would have been spent to get to the point they are at now. Respondents highlighted several areas where mentoring had improved their practices, including improved accuracy of energy use calculations, awareness of risks and understanding of risk mitigation strategies, feasibility assessment, system planning and understanding of capacity requirements for solar PV electricity generation.

As few projects have progressed to construction and post-construction stages, respondents expressed a desire for the programme to continue so that similar mentoring opportunities could be available for procurement, construction oversight and O&M. Respondents also suggested that more learning on non-solar energy sources such as micro hydro and wind would also be valuable.

Table 5: Strengthened renewable energy capability – assessment summary

Result	Assessment summary	Status
Training and mentoring provided according to RE skills gaps analysed	NZMATES has directly trained and mentored 550 people (104 feamle, 446 male) across a range of renewable energy topics. Trainings are based on needs identified in the Programme Framework analysis as well as through indivdual skill gaps analysis carried out with partner organisations.	Very strong evidence of achievement
Skills and knowledge of key government, education and industry partners increased	A combination of satisfaction surveys, reflection workshops, stories of change, and pre and post training testing confirm that knowledge of key government, education and industry partners has increased.	Very strong evidence of achievement
Strengthened RE capability of key government, education and industry partners	Reflection exercises carried out with partners indicate that partner institutions have benefited from capacity building activities and these organisations have stronger capacity due to NZMATES support. However, frequent turnover of staff makes full institutionalisation of capacity building efforts challenging. Furthermore, as few projects have progressed to implementation, there have been limited possibilities for practical construction and O&M capacity building.	Strong evidence of achievement

5.4 Inclusion resilience and sustainability

In addition to effectiveness discussed above, the evaluation findings show that NZMATES has embedded ICESD development principles of inclusion, resilience and sustainability across a range of programme objectives, functions, processes and tools.

Inclusion

The programme is fundamentally oriented towards improving electricity access for historically underserved populations in Maluku and therefore closely aligns with the principle of inclusive development. The analytical framework (the Programme Framework) that underpins the programme includes crosscutting and gender analysis, and community engagement and socioeconomic analysis are standard components of project pipeline activities. The programme recently commissioned research into women's roles and participation in the renewable energy sector and aims to further strengthen its work on inclusion using this as reference.

The programme has sought to encourage women to participate in trainings through outreach and awareness raising. However, with renewable energy perceived to be more closely affiliated with male roles and norms, this has proved challenging. Nevertheless, the programme has achieved an 18.9 per cent participation rate of women in trainings, which is close to its stated target of 20 per cent.

The NZMATES team has a good gender balance with 50 per cent female staff represented across the full spectrum of roles, including in senior management, technical roles, and stakeholder/community engagement.

Given the history of sectarian conflict in Maluku, it is advisable that the programme more strongly demonstrate how it uses social analyses to avoid potential harm and balance the interests of different communities in decision-making.

Resilience

By facilitating greater access to and use of renewable energy, NZMATES seeks to contribute to building more resilient communities. While the programme has not reached the stage where community level change is observable, it is expected to produce a range of benefits that enhance resilience in targeted communities. These may relate to increased access to services, reduced electricity costs, increased business and employment opportunities, and increased safety.

The technical assessments and assistance provided also aim to ensure renewable energy solutions are designed to withstand shocks, such as those related to extreme weather, natural disasters and climate change.

A subsequent phase is required to see NZMATES' resilience goals more fully realised.

Sustainability

With its focus on partnerships, capacity building and the enabling environment in Maluku, the NZMATES approach seeks to promote lasting change. Considerable progress has already been made, with the evaluation finding clear evidence that NZMATES has contributed to a strengthened enabling environment and enhanced capacity for renewable energy in the region.

Its partnerships with education providers also show significant promise, and if partner institutions are successful in fully embedding renewable energy programme into their curricula this will represent a significant long-term gain for the region.

While the sustainability of assets is not something that can be accurately assessed in this evaluation due to the limited number of projects reaching the operations stage, sustainability assessment is conducted for each site during feasibility visits using a tailored sustainability analysis and checklist tool. The programme has also developed and disseminated a guidance note on good practice for sustainability of solar mini-grids in Maluku.

6. Future directions

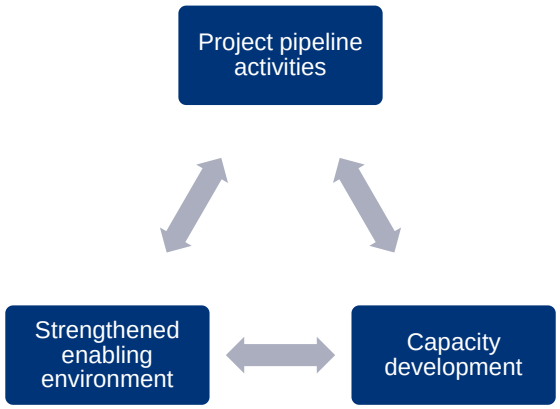
This section brings together the evaluation findings and outlines key considerations for a potential future phase of NZMATES renewable energy programming.

Key evaluation question:

- What are the lessons and recommendations generated through the current phase that can inform future design.

6.1 Conclusions

NZMATES exhibits strong coherence and synergies across its three main work areas, with each component reinforcing the others. The programme has cultivated unique expertise in the institutional, regulatory, socio-cultural, and technical facets of Maluku's renewable energy landscape, and capacity building and technical assistance activities are building on these foundations to effectively contribute to achieving the programme's short and medium-term objectives.



Improved collaboration and enabling environment: The establishment and operation of the Programme Platform and Framework have played a pivotal role in fostering collaboration and enhancing the enabling environment for renewable energy development in Maluku. Through its comprehensive institutional, technical understanding, NZMATES has become a central hub for expertise, facilitating coordination among stakeholders and catalysing engagement at the provincial level. Stakeholder consultations affirm the value of NZMATES in overcoming coordination challenges and positioning itself as a valued intermediary for collaboration on renewable energy development. The programme's efforts have garnered support and recognition from a broad range of stakeholders, indicating its valuable role in promoting progress towards Indonesia's renewable energy goals.

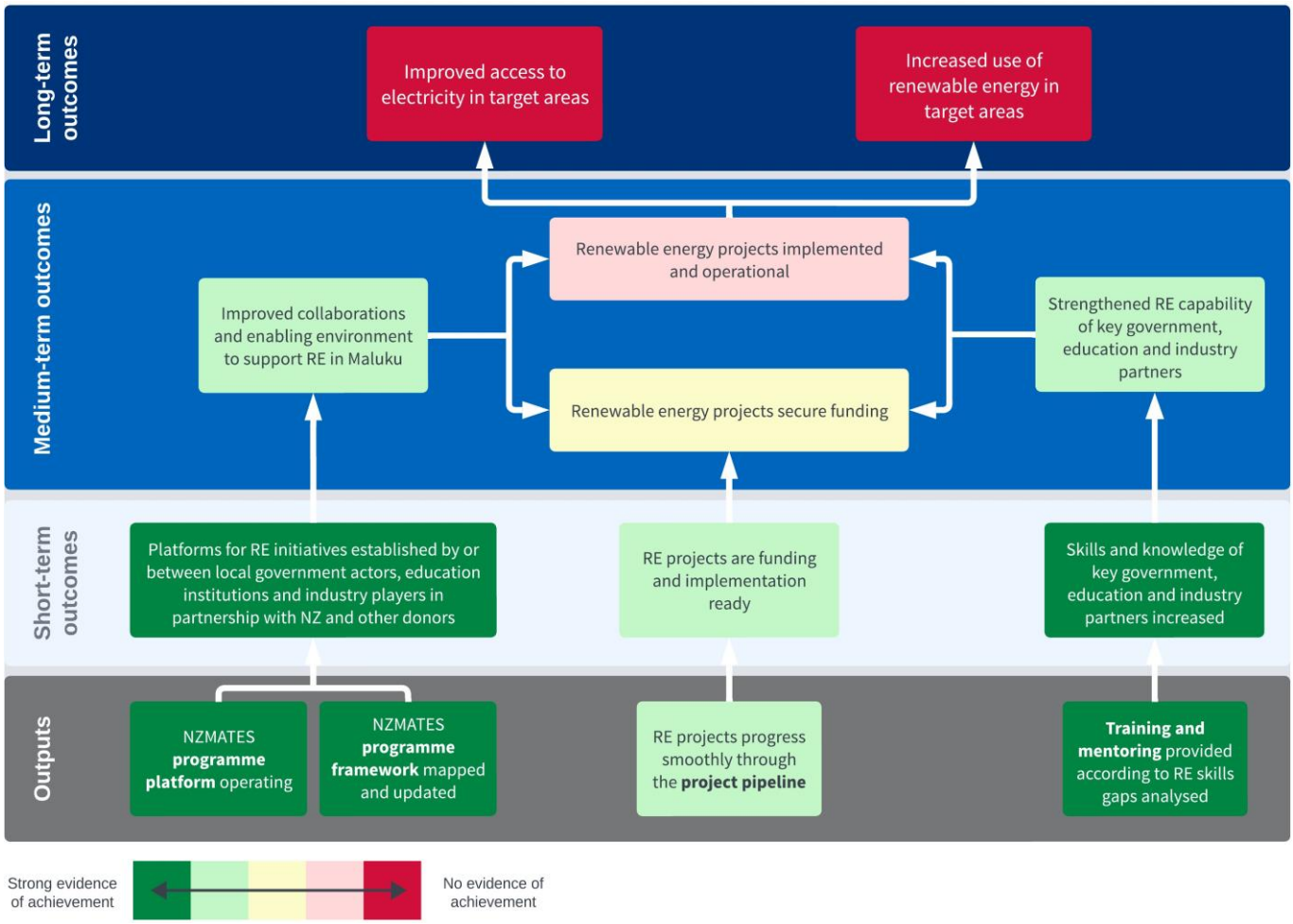
Strengthened renewable energy capability: Capacity building efforts undertaken by NZMATES have contributed to enhancing renewable energy knowledge and skills among key stakeholders in Maluku. Through a combination of training, partnerships with educational institutions, and mentoring initiatives, NZMATES has facilitated skill development and knowledge transfer crucial for advancing renewable energy projects. Stakeholders commend the programme's support in improving understanding and practices related to renewable energy, highlighting the importance of continued mentoring opportunities and diversification of learning beyond project planning stages.

Implemented and operational renewable energy projects: NZMATES' efficacy in guiding projects through the pipeline towards funding readiness and implementation remains critical to its future success. While significant progress has been made in appraising and advancing projects through feasibility stages, challenges persist in securing funding and translating projects into operational renewable energy plants. Despite a relatively low success rate in securing independent funding and progressing projects to implementation, stakeholders remain optimistic about the eventual realisation of project funding. However, addressing funding challenges and achieving an appropriate balance in pipeline activities remain key areas of focus should the programme continue to a new phase.

During stakeholder consultations, a counterfactual scenario was posed: What would the renewable energy landscape in Maluku look like if there was no NZMATES? The consensus among stakeholders is that the pace of renewable energy development would be considerably slower, and knowledge, awareness, and skills related to renewable energy in the province would be much more limited.

Assessing progress made thus far indicates that the programme has reached a point approximately midway toward achieving the long-term outcomes outlined in the programme logic. To fully meet these objectives, continued investment will be necessary. A summary of the progress made to date is shown in Figure 7 below.

Figure 7: Assessment of progress against the NZMATES programme logic NZMATES programme logic



6.2 Considerations for a potential future phase of renewable energy support

Areas of consideration for a potential future phase of NZMATES are summarised below. They are based on the evaluation findings and recommendations provided from internal and external stakeholders.

These considerations are to stimulate thinking and analysis on a potential future phase of NZMATES and are not a substitute for a full activity design. Should MFAT decide to pursue a new programme phase, the areas identified here are best further explored as a part of a full activity design process.

The case for a second phase

The case for embarking on a second phase of the NZMATES programme is strong. Drawing upon the solid foundations established through the Programme Platform and Framework, NZMATES has carved out a distinctive niche in the renewable energy landscape of Maluku. Its current role in renewable energy planning and coordination in Maluku is pivotal, and there is strong and unanimous support for NZMATES continuation among key programme stakeholders.

Fully realising the potential of NZMATES investments to date is only possible if the programme continues to build on the foundations established during this initial programme period. Most stakeholders with insight into the programme suggest it is best viewed as close to a midway point and exiting now risks the gains made thus far.

Key considerations for MFAT decision-making:

- **Investment and progress:**
  - NZMATES has invested significant time and resources to reach its current position. To fully realise the gains from this investment, a new phase is recommended.
  - With a promising pipeline of potential projects, prematurely exiting the programme would undermine the progress made thus far.
- **Project pipeline momentum:**
  - While project pipeline activities may not yet have reached their full potential, a new phase has the potential to propel NZMATES into a decisive “take-off” period as projects mature and funding opportunities materialise.
- **Growing interest in renewable energy:**
  - National and international interest in renewable energy continues to grow.
  - NZMATES is strategically positioned to capitalise on this momentum and achieve substantial impact.

Expanding NZMATES: Considerations for geographical scope

NZMATES’ concentrated presence in Ambon has been pivotal to its perceived relevance and effectiveness. This focused approach has prevented dilution and played a crucial role in establishing valued relationships at the provincial level.

However, with NZMATES now firmly established and well-connected in Maluku, compelling arguments emerge for expanding its reach to include North Maluku if it is to continue to a new phase. Both EBTKE and PLN have expressed interest in this expansion. Notably, the PLN office in Ambon already serves both provinces, and the needs and context in these regions align closely. Furthermore, the development and renewable energy landscape in North Maluku remains relatively unsupported by national and international development initiatives.

Key considerations for MFAT decision-making:

- **Technical feasibility:**
  - Respondents generally believe that an expansion to the North need not require a full-time presence in the province.
  - Technical work can be effectively managed from the existing office.
- **Relationship building and representation:**
  - While technical functions can be managed from Ambon, there may be value in establishing representation in North Maluku.
  - Building relationships and supporting the provincial government may benefit from localised engagement.
- **Efficiency and quality assurance:**
  - Servicing the North from the existing Ambon hub offers an efficient value proposition.
  - However, careful attention must be paid to avoid weakening engagement in Maluku.

Enhancing NZMATES engagement and funding strategies at the national level

It is evident from consultations that NZMATES' regional perspective holds significant value at the national level. It may therefore be worth exploring opportunities to strengthen engagement efforts in Jakarta to facilitate knowledge sharing, strengthen partnerships and more actively pursue funding opportunities.

Given the criticality of identifying funding for projects in the pipeline, it may also be worth considering whether the NZMATES team has the right expertise in renewable energy financing and funding to navigate diverse funding channels, particularly with private entities.

Key considerations for MFAT decision-making:

- **Boosting national presence:**
  - Consider enhancing NZMATES' visibility in Jakarta. A stronger national presence may foster partnerships and facilitate connections with potential funding sources.
  - Explore joint initiatives and knowledge exchange with peer programmes to maximise impact. In particular, there are clear synergies between NZMATES and the Renewable Energy – Accelerated Transition in Indonesia (RE-ACT) programme managed by GGGI and funded by MFAT. A new phase should explore how RE-ACT's work developing de-risking instruments and financing mechanisms can be leveraged to enhance funding opportunities projects in the NZMATES pipeline.
- **Skills enhancement for funding pursuit:**
  - Given the critical importance of securing funding for pipeline projects, evaluate whether the NZMATES team requires additional skills and capacity.
  - Specifically, consider bolstering expertise in renewable energy financing and funding to navigate diverse funding channels.

Planning for asset transfer

A potential upcoming phase represents a valuable opportunity to proactively address asset transfer challenges from the outset. By doing so, NZMATES and MFAT can pave the way for a more streamlined processes going forward.

It is recommended that MFAT initiates a thorough analysis of contract and asset transfer options and identifies a deliberate approach to addressing this should the programme continue to a new phase.

Key considerations for MFAT decision-making:

- **Early analysis during design:**
  - During the design phase, thorough analysis should be conducted to identify potential pathways for addressing asset transfer issues. This proactive approach will help to anticipate and mitigate any future hurdles.
- **Potential options:**
  - Use of waivers to facilitate smoother asset transfers.
  - Inclusion of named asset holders within contractual agreements
  - Transfer to government at village level through Village-Owned Enterprises (BUMDes).
- **Learn from past experiences:**
  - Reflect on existing processes regarding the use of discretionary funds to identify and if necessary, rectify issues related to asset transfer early on.
  - Consider adding asset transfer considerations to procedures for approving funding if it is not already part of MFAT protocols.

Strengthening local capacity within NZMATES

Recognising the relative scarcity of renewable energy technical skills in Maluku and the challenges associated with bringing in outside expertise, NZMATES made a strategic shift from external hiring to building the capacity of local Maluku-based staff. This transition is proving effective and warrants continuation.

Key considerations for MFAT decision-making:

- **Long-term expertise:**
  - By investing in local staff development, NZMATES contributes to the development of sustainable expertise within Maluku.
  - This approach not only builds technical skills but also mitigates the risks associated with staff turnover.
- **Broadening relationships:**
  - Strengthening local teams also facilitates effective long-term relationships with partners ensuring programme activities are driven by partner needs.

Progressing technical assistance and capacity Development

While technical assistance and capacity development have been effective and well-received, there remains a challenge related to the limited number of projects progressing to implementation and operations stages. The primary focus has been on planning and feasibility, leaving fewer opportunities for capacity building beyond these initial steps.

Looking ahead, a potential future phase presents an opportunity to extend technical assistance and capacity building to cover procurement, implementation, and ongoing operations and maintenance (O&M). Additionally, demonstration sites have proven to be of significant value. Notably, the refurbishment of the solar power plant on Pulau Tiga offers excellent prospects for further capacity building.

Key considerations for MFAT decision-making:

- **O&M Capacity Development:**
  - The next phase should prioritise capacity development to support efficient operations and maintenance.
  - Strengthening O&M skills will enhance project sustainability.
- **Demonstration Sites:**
  - Demonstrations have added substantial value.
  - Exploring greater utilisation of demonstration sites can further enhance capacity building efforts.

Enhancing monitoring and evaluation for NZMATES

If the programme enters a new phase, it presents an opportune moment to revitalise the monitoring and evaluation framework. This update should aim to provide sharper insights for enhanced decision-making and facilitating adaptive management. A key strategy should involve closer monitoring and analysis of the project pipeline activities, enabling the identification of imbalances and driving the NZMATES team's focus.

Key considerations for MFAT decision-making:

- **Pipeline monitoring:**
  - Closely monitor the progress of projects through each stage of the pipeline, including the proportion of projects at each step.
  - Identify bottlenecks and imbalances in the project pipeline which should trigger management responses and changes in programme emphasis.
- **Case studies for insights:**
  - Develop case studies to build a robust evidence base that illuminates both barriers and enablers of success within the programme.
- **Baseline reassessment:**
  - Establish an overarching baseline that is tightly focused on the outcomes identified in the programme logic.
  - Additionally, adopt a more flexible and in-depth approach linked to individual sites that have secured funding, incorporating socioeconomic measures.

Leveraging collaborations with education providers for sustainable impact

Collaborations with educational institutions have emerged as a powerful catalyst for long-term change within the NZMATES programme. While substantial progress has been achieved, the true milestone lies in successfully introducing autonomous and self-sufficient renewable energy programmes within these institutions.

Achieving this requires continuation of the programme and further investment in these partnerships.

Key considerations for MFAT decision-making:

- **University and Polytech collaborations:**
  - The partnerships established with University of Pattimura (Unpatti) and Ambon State Polytechnic hold great promise for sustainable transformation.
  - NZMATES should continue nurturing these relationships until the programmes are fully integrated into the institutional fabric.
- **Solar laboratory collaboration:**
  - Facilitate collaboration between the Centre for Development of Human Resources (PPSDM) and the Unpatti.
  - Utilising the solar laboratory for training public sector employees in Maluku would enhance efficiency for PPSDM and elevate the status and use of the university's facilities.
- **Mutual interest and prestige:**
  - NZMATES should continue to promote collaboration between New Zealand and Indonesian tertiary education providers.
  - This partnership not only reflects mutual interest but also adds prestige to NZMATES, which can be strategically leveraged to enhance programme outcomes.

Annex A – Methodology and approach to data collection

Evaluative approach

The NZMATES evaluation took on a realist approach to respond to the evaluation objectives and developed evidence-based and actionable findings and recommendations for the programme and its key stakeholders. To respond to these strategic and operational questions, Tetra Tech's evaluation team drew on theory-based, process evaluation approaches.

Co-design, participatory and evaluation capacity-building approaches: The evaluation process was geared towards shared mutual learning and collaboration across the evaluation team, MFAT, and in-country partners. As such, the evaluation scope, key evaluation questions, and data collection methods were co-designed with MFAT staff. The evaluation team held regular meetings with MFAT throughout the evaluation process to promote shared learning, sense check emerging findings, and test recommendations.

Summative and formative evaluation: The evaluation applied both formative and summative assessment approaches. The evaluation process evaluated results achieved over the lifetime of NZMATES as well as identified areas of support and focus, thematic and geographic priorities, partnership arrangements, and implementation approaches to inform future programme design and implementation.

A focus on measuring results based on evidence: It was critical to measure the results of activities to drive development effectiveness and so, the evaluation team carefully designed data collection methods to measure results achieved, using a multi-staged, mixed methods approach featuring both qualitative and quantitative research techniques where feasible and available.

Progressive inquiry: The evaluation used a progressive inquiry technique whereby rapid analysis of evidence from each line of inquiry was used to inform further exploration along related lines of inquiry. This ensured the evaluation remained open and responsive to new or unanticipated information and that evidence was built on itself to enable the evaluation team to develop a comprehensive picture of the Programme.

Realist approach: Given the complexity of international development contexts and unanticipated factors that can shape programme implementation, the evaluation adopted a realist approach. The realist approach situated analysis of programme responses in their context and considered what worked, for whom, and under what circumstances.

Documents reviewed

The following documents were reviewed to inform this evaluation:

1. NZMATES Activity Monitoring Assessments (AMA) 2018-19
2. NZMATES Activity Monitoring Assessments (AMA) 2019-20
3. NZMATES Activity Monitoring Assessments (AMA) 2020-21
4. NZMATES Activity Monitoring Assessments (AMA) 2021-22
5. NZMATES Final Report Partners Story of Change
6. NZMATES Annual Report 2018-19
7. NZMATES Annual Report 2020-21
8. NZMATES Annual Report 2021-22
9. NZMATES Annual Report 2022-23
10. NZMATES Implementation Plan
11. NZMATES Mid-Year Report 2019
12. NZMATES Results Framework
13. NZMATES Results Framework Update
14. NZMATES Activity Design Document
15. NZMATES Project Pipeline Tracking
16. NZMATES Baseline Study
17. Asian Development Bank (ADB), "Sustainable Energy Access in Eastern Indonesia—Electricity Grid Development Program (Phase 2) (RRP INO 51114)".

18. Climate Policy Database, “National Energy Policy (Government Regulation No. 79/14) Indonesia (2014)”. Available at: National Energy Policy (Government Regulation No. 79/14) | Climate Policy Database
19. Karjadi, M and Bambang, H. 2022. “Planning of Photovoltaic (PV) Type Solar Power Plant as An Alternative Energy of the Future in Indonesia”. *International Journal of Future Studies*, Vol. 5 No. 2.
20. New Zealand’s Ministry of Foreign Affairs and Trade (MFAT) ASEAN Four Year Plan
21. MFAT International Cooperation for Effective Sustainable Development
22. New Zealand-Indonesia Joint Commitment for Development with Indonesia (2017-2022)
23. National Energy Council of Indonesia, “Government Regulation No. 79/2014 regarding the National Energy Policy”, Jakarta, 2014
24. Draft Government Regulation About National Energy Policy, (2024), National Energy Council of Indonesia, consultation with the House of Representatives of the Republic of Indonesia December 2023.

Stakeholders consulted

Stakeholder Organisation	Number of informants	Consultation Method
Directorate General - New Renewable Energy and Energy Conservation (DG-EBTKE)	4	Key informant interview
Energy and Mineral Resources Office of Maluku Province	6	Key informant interview
National Energy Council (DEN)	4	Key informant interview
State Electricity Company (PLN) Jakarta	3	Key informant interview (online)
State Electricity Company (PLN) Maluku	3	Key informant interview
PT Sarana Multi Infrastruktur (PT SMI)	2	Key informant interview
Centre for Development of Human Resources (PPSDM)	3	Key informant interview
SECO Renewable Energy Skills Development programme (RESD)	2	Key informant interview (online)
Global Green Growth Initiative (GGGI)	1	Key informant interview
Asian Development Bank (ADB)	3	Key informant interview
USAID (SINAR)	3	Key informant interview
United Nations Development Programme (UNDP)	1	Key informant interview
MENTARI	1	Key informant interview
NZ Embassy	1	Key informant interview
Regional Planning Agency (Bappeda)	2	Key informant interview
Pattimura University (Unpatti)	1	Key informant interview
Ambon State Polytech	3	Key informant interview
MFAT	3	Key informant interviews (online)
Mercy Corp Indonesia	3	Key informant interviews / workshop
Infratec	1	Key informant interviews / workshop

Annex B: Summary analysis of indicator table

This section presents a summary assessment of the indicators outlined in the NZMATES M&E Framework. While these were used as evidence when assessing programme progress for this evalaution, they were not the sole source of evidence used to determine whether a result has been achieved. There is therefore some deviation between the status of indicators and the overall assessment of results.

- Very strong evidence of achievement
- Strong evidence of achievement
- Some evidence of achievement
- Weak evidence of achievement
- No evidence of achievement

Output 1: NZMATES programme platform operating

Indicators	Assessment	Status
Qualified Programme Management Office (PMO) team in place	Over the last 6 years, qualified personnel have been employed to support the early stages of the NZMATES programme and new positions to suppot the PMO have been considered.	
PMO has sound, relevant procedures and policies in place, approved by Programme Manager and updated annually	NZMATES has provided support to staff to work from home, and with the use of virtual technologies such as Zoom and Slack for regular communication, the team continues to support each other by maintaining morale and motivation through online social activities.	
Results framework reviewed annually and endorsed by Programme Steering Group (PSG)	NZMATES implemented a new process of reflection meeting with partners in February – March 2021 to gather partners' perspectives on NZMATES' performance and identify areas for improvement. The meetings were conducted fully online, using online forms and Zoom meetings. Since then, regular internal workshops with the NZMATES team has helped identify successes, challenges, changes and opportunities.	
Number of PSG meetings that are well-attended and produce clear outcomes	Attendance for PSG meetings have steadily been increasing over the years; focusing on developing a pipeline wokrplan in collaboration with key parties and employing new adaptations to the Covid-19 pandemic.	
Number of Technical Committee (TC) meetings that are well-attended and produce clear outcomes	Attendance for TC meetings have steadily been increasing over the years; detailing clear outcomes that the implementation projects in Pulau Tiga and UnPatti Solar Lab would continue and countermeasures to COVID-19 will be placed.	

Output 2: NZMATES programme framework mapped and updated

Indicators	Assessment	Status
Institutional framework mapping updated annually and approved by PM.	Under the Institutional Framework, NZMATES continues to monitor the development of regulation related to the renewable energy and electricity sectors, while continuing to update information socioeconomic and cross-cutting issues.	
Technical framework analysis updated annually and approved by PM.	The Technical Framework is updated with data and information related to renewable energy and electrification plan. New data collected are references for RUED document, and existing studies on renewable energy potential in Maluku.	
Financing, funding and grants catalogue updated annually and approved by PM.	NZMATEs has sought other fund-seeking activities from a range of international stakeholders to monitor additional sources of funding and ensure activities align with NZMATEs objectives.	

Output 3: Renewable energy projects progress smoothly through the project pipeline

Indicators	Assessment	Status
Number of RE projects in the NZMATES pipeline that have made progress towards funding.	NZMATES has also supported PLN with its planning to reach the target of 23 per cent renewable energy by 2025. NZMATES worked with PLN MMU staff to put together a list of viable renewable energy projects, based on PLN's existing plans, NZMATES' pipeline and other studies, and compiled technical and economic data, to show that it is feasible for PLN MMU to reach the renewable energy mix target within the specified timeframe.	
Number of RE projects or initiatives appraised for potential inclusion in the pipeline	NZMATES prepared three pre-feasibility studies for PLN on potential hybrid PLTS and new off-grid PLTS sites (according to PLN yearly planning), identifying the most promising solutions for each site and prioritising locations in terms of technical and economic feasibility.	
Number of assessments, studies or surveys conducted to support RE projects and received by partners.	NZMATEs continues to actively find new alternative solutions to finance refurbishment, hybridised and new PLTS projects for PLN. By collaborating with other partners, NZMATES continues to work with MENTARI to align technical assumptions and modelling inputs, and prioritise sites together with PLN.	
Number of RE projects in the NZMATES pipeline that have made progress towards funding.	Projects are considered to have progressed in the project pipeline when they are still actively undergoing assessment. A total of 202 sites entered the pipeline with 124 moving to feasibility study stage.	

Output 4: Training and mentoring provided according to renewable energy skills gaps analysed

Indicators	Assessment	Status
Number of people who receive training and/or mentoring through NZMATES	The number of attendees who have received training and/or monitoring through NZMATES has steadily increased each year.	
Number of training activities conducted aligned with identified skill gaps.	Over the years, the number of activities have steadily increased over the years and are aligned with addressing identified skill gaps' covinvering industry-relevant topics related to renewable energy.	
Number of training arrangements established between Indonesian and NZ universities or other educational institutions	MoU signed between UNPATTI and VUW,	
Percentage of people reporting satisfaction with relevance of training	Participants are overall satisfied with the relevance of training provided.	

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

Indicators	Assessment	Status
Number of project assistance requests from private sector, government or community	The number of project assistance requests from government and PLN have increased substantially with recent years indicating that the number of actual projects have exceeded the target outcome.	
Number of functional RE platforms/mechanisms supported by NZMATES	Operating at the provincial and national level, the NZMATES Technical Committee and NZMATES Programme Steering Group have been effective in strengthening coordination and collaboration between different stakeholders in the energy sector.	

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

Indicators	Assessment	Status
Number of off-grid projects meeting funding-ready criteria and/or ready to be implemented.	The number for off-grid projects that have exceeded meeting funding-ready criertia have slowly been increasing over the years.	
Number of grid-connected projects meeting funding-ready criteria and/or ready to be implemented.	The number of grid-connect projects meeting funding-ready criteria have slowly been increasing over the years.	

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

Indicators	Assessment	Status
Number of PLN and ESDM staff with increased skills and knowledge after participating in training activities through NZMATES.	NZMATES has held several training activities for key partners, education institutions, and other stakeholders. As a result, the number of PLN and ESDM staff with increased skills following the participation of activities has increased and even exceeded the expected LOP target.	
Number of individuals from other organisations (companies, communities, educational institutions) with increased RE skills and knowledge after participating in training activities through NZMATES.	Following the participation of training activities through NZMATES, results indicate that individuals from other companies (companies, communites, educational institusions) have improved RE skills and knowledging; exceeding the expected LOP target.	

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

Indicators	Assessment	Status
Stories of changes related to stakeholder collaboration and RE enabling environment in Maluku	Stakeholder collaboration have steadily been improving over the years; exceeding the LOP target and strengthening the skills of PLN employees to conduct efficient and effective feasibility studies.	
Number of collaborative actions to support RE in Maluku	NZMATES has facilitated several focus group discussions and encouraged collaborative actions to support RE in Maluku; as the number of collaborative actions has steadily been increasing over the years.	

Medium-term outcome 2: Renewable energy projects secure funding

Indicators	Assessment	Status
Number of off-grid RE generation projects from the NZMATES pipeline that have secured implementation funding.	The number of off-grid RE Generation projects from the NZMATES pipeline that have secured implementing funding has steadily been increasing over the years; reaching LOP target.	
Number of grid-connected RE generation projects from the NZMATES pipeline that have secured implementation funding.	The number of off-grid RE Generation projects from the NZMATES pipeline that have secured implementing funding has steadily been increasing over the years; far exceeding the LOP target.	

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

Indicators	Assessment	Status
Number of off-grid RE generation systems from the NZMATES pipeline that are operating sustainably.	There has been little evidence that indicates the number of off-grid RE generation systems from the NZMATES pipeline have increased; with no indication in achieving LOP target.	
Number of grid-connected RE generation systems from the NZMATES pipeline that are operating sustainably.	There has been little evidence that indicates the number of grid-connected RE generation systems from the NZMATES pipeline have increased; with no indication in achieving LOP target.	

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

Indicators	Assessment	Status
Number of actions taken by partners to respond to/follow up on training and mentoring provided by NZMATES	Over the years, several activities including focus group discussions and monitoring sessions have been conducted to follow up and determine the feasibility of training provided by NZMATES; exceeding the LOP target.	
Number of institutions in Maluku with improved capability to deliver RE technical training programmes	Over the years, the number of institutions in Maluku have gained improved skills and capability to deliver RE technical training training programmes, exceeding the LOP target.	

Long-term outcome 1: Improved access to electricity in target areas

Indicators	Assessment	Status
Percentage (%) of all households in Maluku Province with access to electricity.	N/A	

Long-term outcome 2: Increased use of renewable energy in target areas

Indicators	Assessment	Status
Percentage (%) of electricity produced in Maluku from renewable energy sources.	N/A	