Annex J: Supplementary Information after Developments from June 2023 to January 2024

The following information in the Annexure is to supplement the Terminal Evaluation Report of the Barrier Removal for Achieving the National Road Map Targets (BRANTV) Vanuatu, in line with the second extension to January 2024.

This section includes the various updates about the project in terms of both its further achievements as well as the scope of learning for future projects towards green energy.

As stated earlier, one of the key results the project has given is laying the foundation of the National Electrification Master Plan (NEMP). The NEMP has been established, but its successful implementation will require significant effort from all stakeholders. This has made considerable headway and would lead to access of electricity to the dwellers thus promoting economic progress in future. The Rural Off-Grid Electrification Master Plan outlines Vanuatu's path to 100% electrification, utilizing GIS and energy modelling to identify cost-effective options, requiring an estimated $106.3 million by 2030. Implementing the NEMP would require Phase 1 of on the field feasibility studies to validate technical and economic model designed from the GIS platform and cost of investment associated with its proposal.

About 100 members of the Vanwods received funding towards RE Solar systems for their small businesses. As opposed to earlier 23 communities, now 37 communities that have RE community scale PV solar systems installed are benefitting from the system against a nominal fee, which will be further streamlined once NEMP is fully in place. DOE also aims to financially empower the communities by transferring the managerial processes to the communities themselves. These communities experienced positive impacts with over 50,000 indirect beneficiaries gaining access to power through 37 demonstrated RE systems resulting in improved economic, educational, and community outcomes. The 8.8kW Pico-Hydro PV Solar Hybrid mini-grid system in Loltong serves as a cost-efficient and proven model suitable for rural communities, managed by local operators under diverse governance models for long-term sustainability. The BRANTV RE models demonstrate both technical viability and economic visibility. BRANTV has also managed to develop the Policy and Regulatory Framework for the Department of Energy, coordinating institutional agreements to enforce RE standards and policies across seven project sites. The BRANTV PMU collaborated with the Pacific Vocational Training College to create a training module, EEPA0811, offering seven sessions for community RE training, resulting in certification submitted to Vanuatu Quality Authority. An international consultant enhanced energy efficiency in cook stoves and copra dryers, achieving up to 45% efficiency.

2023 Project Budget and Expenditures as of December 2023							
Output	Approved Budget	Commitments (July 2023-January 2024)	Expenses July-January	Total Expenses and Commitments	Outstanding NEX Advances	Budget Balance	Delivery Rate
Total	**1,147,517.75**	**136,540.33**	**685,585.77**	**823,126.1**	**191,653.94**	**132,737.71**	**88%**

Table 1: Budgets and Expenditure

Source of Funds (All Sources of Funds)	Co-financing Amount	Type of Co-financing	Investment Mobilized	Output	Status Update
Romanian Funding	60,736.20	Grant	Investment mobilized	Amatbobo Project site	Completed Dec 2023
Vanuatu Government	170,616 - 2021 (VUV19,473,684)	Grant	Investment mobilized	Feasibility Study report for 10 Pico Hydro mini grids	Completed June 2023
Vanuatu Government	170,616 - 2022	Grant	Investment mobilized	Installation of Pico-Hydro PV Solar Hybrid Mini-Grid of Loltong	Completed October 2021
Vanuatu Government	99,738.41	In-Kind Support	Recurrent expenditure	Office Space, Stationary, Communications for 5 years	On-going for 5 years 2019 - 2023
Vanuatu Government	2,272,727.27	In-Kind Support	Investment mobilized	MoCC cost of staffs directly involved in the implementation of BRANTV (VT50,000,000/ year x 5 years = VT250,000,000 /110 (exc.rate) = USD2,272,727. 27	Ongoing for 5 years from 2019 - 2023
GEF Agency (UNDP)	100,000	Grant	Investment mobilized	UNDP support towards BRANTV	Completed by June 2023

Others (PCREEE)	2463.31	Grant	Investment mobilized	Support toward Component 1 on RE Training and training manual (RE training venue, catering on Kole Santo and translation of RE training manual into Bislama version)	Completed by June 2023
Total	**USD2,876,897.19**				

Table 2: Co-financing

1. Monitoring & Evaluation (M&E)	Rating
M&E design at entry	Satisfactory (5)
M&E Plan implementation	Satisfactory (5)
Overall Quality of M&E	Satisfactory (5)
2. Implementing Agency (IA) Implementation & Executing Agency (EA) Execution	**Rating**
Quality of UNDP Implementation/Oversight	Satisfactory (5)
Quality of Implementing Partner Execution	Satisfactory (5)
Overall quality of Implementation/Execution	Satisfactory (5)
3. Assessment of Outcomes	**Rating**
Relevance	Highly Satisfactory (6)
Effectiveness	Satisfactory (5)
Efficiency	Satisfactory (5)
Overall Project Outcome Rating	Satisfactory (5)
4. Sustainability	**Rating**
Financial sustainability	Moderately Likely (3)
Socio-political sustainability	Likely (4)
Institutional framework and governance sustainability	Likely (4)

Environmental sustainability	Likely (4)
Overall Likelihood of Sustainability	Likely (4)

Table 3: Terminal Evaluation Ratings and Achievement Summary Table [1]

Following some of the key developments over the last leg of extension, it can be said that the BRANTV project is rated as *Highly Satisfactory* considering TE scope which covers the full project cycle and most current developments. An extension as witnessed in 2023 leading to achievement of many targets can serve as a blueprint for another extension or a follow up project to achieve all the targets that are yet to be accomplished as well.

Component 1: Capacity Building and Awareness Enhancement on Sustainable Energy and Low Carbon Development

The BRANTV PMU with the support of the Department of Energy had a collaboration with the local training institution the Pacific Vocational Training College (PVTC) to develop a training module for BRANTV to deliver on the RE training for the community. The training Unit Standard: EEPA0811 – Solve basic problems in photovoltaic energy apparatus and systems, was developed and 7 training sessions were conducted for all communities of the BRANTV Project sites. All participants attending this training module has their names submitted to Vanuatu Quality Authority (VQA) by PVTC to be certified. The Energy Efficient training was made possible by an international consultant an expert in the EE cook stoves and copra dryer. The results of energy efficiency tested is up to 45% efficient. This figure is far greater than any other types available in country. Video production, brochures and pamphlet were also produced for BRANTV project sites broadcasting success stories from the communities.

Component 2: Improvement of Energy Policy and Planning Formulation and Implementation.

The Rural Off Grid Electrification Master Plan had determined plan for the entire country of Vanuatu. A summary of the plan is portrayed in the table below. To achieve a hundred percent electrification in Vanuatu with the incorporation of renewable energy technologies the masterplan has identified the least cost electrification options in all of the islands of Vanuatu through the use of GIS and energy modeling.The total investment required for implementation by 2030 for new capacity addition would reach 106,292,200 USD i.e approximately one hundred and six million USD approximately.

Technology	Population 2030	New Connections 2030	New Capacity by 2030 (kW)	Investment by 2030 (USD)
Grid	294,848	44,011	5,616.77	71,589,136
Mini Grid_Hydro	11,715	11,715	565.25	5,863,123
Mini Grid Solar	11,051	11,051	1,008.21	4,423,757
Mini Grid_Wind	2,641	2,641	202.87	945,459
Standalone Solar	56,366	56,366	4,895.78	23,470,725
Grand Total	**376,621**	**125,784**	**12,288.88**	**106,292,200**

[1]As per the Rating Scale provided Outcomes, Effectiveness, Efficiency, M&E, Implementation/Oversight & Execution, Relevance are rated on a 6-point scale: 6=Highly Satisfactory (HS), 5=Satisfactory (S), 4=Moderately Satisfactory (MS), 3=Moderately Unsatisfactory (MU), 2=Unsatisfactory (U), 1=Highly Unsatisfactory (HU). Sustainability is rated on a 4-point scale: 4=Likely (L), 3=Moderately Likely (ML), 2=Moderately Unlikely (MU), 1=Unlikely (U)

Table 4: Strategic Results

Two other policy documents developed under this outcome; the National Guidelines and Standards for Small Micro Hydro Mini Grid and Village Community PV Systems, and the Policy and Regulatory Framework for Off Grid Rural Electrification in Vanuatu. These to policies will further support the roll out of Rural Electrification in Vanuatu.

Component 3: Institutional Framework Enhancement for Sustainable Energy and Low Carbon Development

While BRANTV has coordinated signing of institutional agreements between the ministry and parties responsible and have, direct interventions with the energy projects at community level. These partnerships agreement will uphold RE standards and enforce policies and regulations of the RE systems. The MOA was signed between Ministry of Climate Change department of Energy with stakeholders and communities for seven project sites. These MoA will strengthen future collaboration between stakeholders, private sectors and individuals to implement Off Grid Rural Electrification Policy and Regulatory Framework in Vanuatu and thus promote low carbon technologies.

Component 4: Sustainable Energy and Low Carbon Initiatives Financing

In addition to the Developing the National Green Energy Fund Resource Mobilization and Institutional Sustainability Plan in 2020, the BRANTV PMU further had supported the negotiations of Vanwods Women microfinance scheme to access the financial loans offered by NGEF towards RE and EE systems. UN Women had supported the Vanwods to co-finance 50% of lending offered to 100 members of the Vanwods towards RE Solar systems for their small businesses.

Outcome 5A: Viable (technical and economic) sustainable energy and low carbon (RE and EE) techniques and practices adopted and implemented in the energy, public, private sector, and residential sectors of the country.

Research was undertaken to determine the quality and pricing of RE and EE materials in country. The report has supported DoE and PMU with demonstrations of RE and EE technologies in the communities. Further research was carried out on the potentials of technologies and investment cost of Pico-hydro mini grids in Vanuatu. The study has resulted to a feasibility report of 10 potential sites of Pico-hydro mini grid for BRANTV project. The feasibility study reports had resulted to Japanese funding of USD4.6 million towards constructing up to 4 project sites of Pico-micro hydro mini grids. The project is called 'Project for Promoting Green Transformation in the Pacific Region towards Net-zero and Climate-resilient development – Vanuatu ' or 'V-GET'. The reports will support the Vanuatu Government and UNDP to attract potential donors to fund next phases of installations.

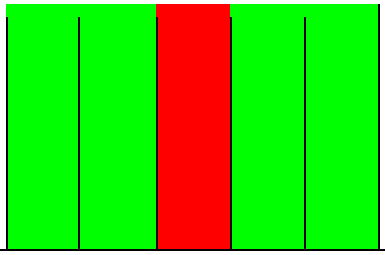
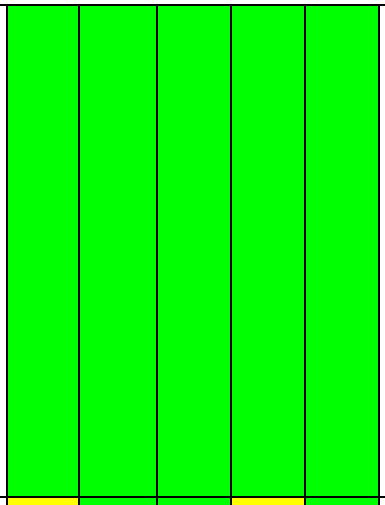
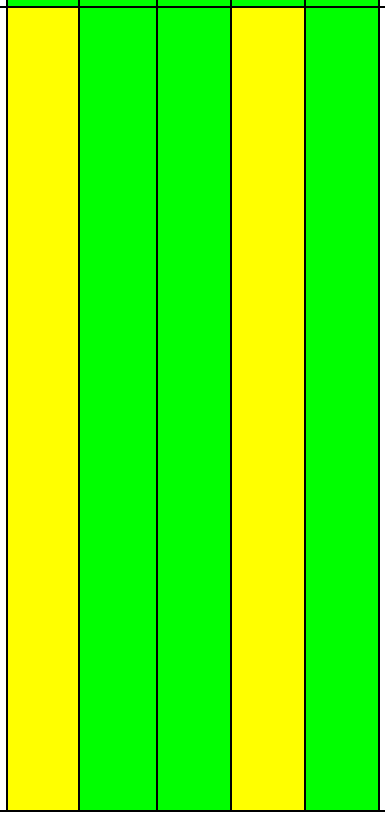
Outcome 5B: Enhanced confidence in the economic and technical viability and long-term sustainability of sustainable energy and low carbon technology projects.

Total of 37 RE technologies were demonstrated in 37 communities throughout Vanuatu affecting lives of over 50,000 beneficiaries including women and children who have access to power and lightings for economic benefits and household needs. There are success stories of women earning extra income, children have access to good lightings for reading, and community events have been successful. There are testimonies of transitioning in life from access to electricity transitioning in people's perspective of life. They learn to embrace the changes that electricity brings into the community. The 8.8kW

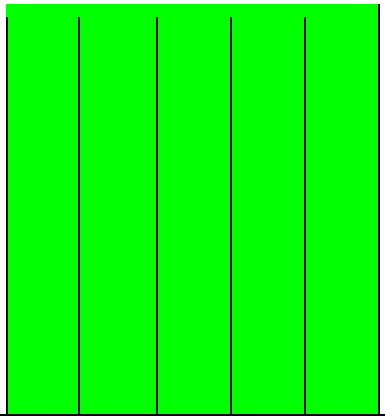
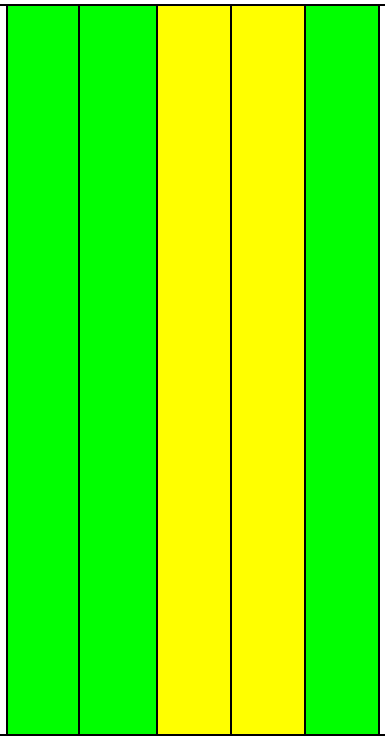
capacity of Pico-Hydro PV Solar Hybrid mini-grid system of Loltong is a model that proven to be cost efficient and technology proven for the rural community context. The investment is affordable and less sophisticated that can be managed by local community operator.

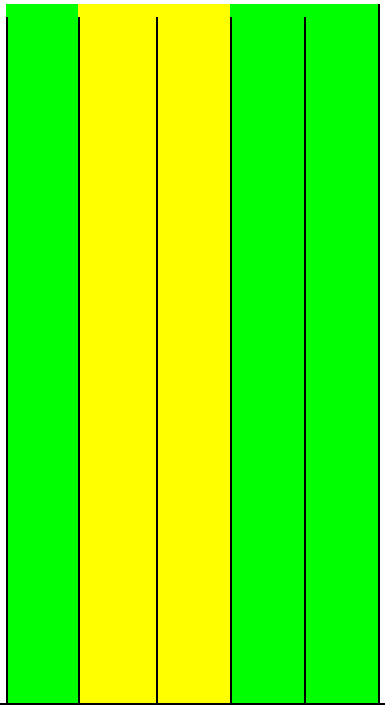
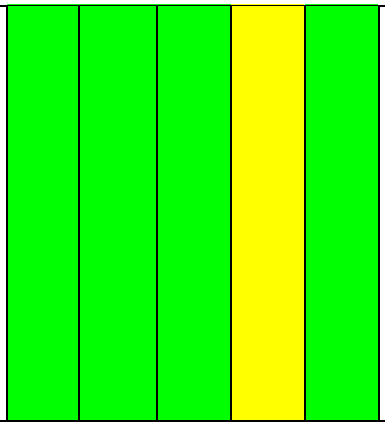
Each project site has its own management model based on the existing community governance system that proves to be sustainable in the long term. Example are women associations management model, council of chief's management model, fishery associations management model, cooperative management model, famers association management model, school management model and others. The BRANTV RE models proven to be technical viable and economical visible. Overall, the goal is to establish reliable sourcing channels, transparent cost information, and local parts supply for various renewable energy and energy efficiency systems in Vanuatu.

Indicators	End of Project Targets	SMART Criteria					Comments
		S	M	A	R	T	
Objective: Enabling the achievement of the energy access, sustainable energy, and green growth targets of Vanuatu							
Cumulative tons of incremental GHG emissions reduced from business as usual (tons CO2)	45,016.1						Unlikely to be achieved within the project time frame.
Incremental number of households (with at least 20% woman-headed) in rural areas whose level of energy access is increased via village-scale off-grid RE or that benefit from newly adopting EE cook stoves	14,000						Unlikely to be achieved within the project time frame.
Total new, incremental reductions in or newly avoided amounts of annual diesel consumption achieved (liters DFO)	272,212						There is a possibility to achieve this outcome.

Incremental fuel wood saved annually by use of energy efficient cook stoves, million kgs	15.6		Unlikely to be achieved within the project time frame.
Outcome 1: Improved capacity and awareness on sustainable energy, energy access, and low carbon development in the energy, public, private, and residential sectors			
Number of individuals (with at least 30% being women) in Vanuatu that are newly (as of start of project) involved in operating, maintaining, repairing, designing, and/or installing off-grid rural RE power systems as one of their main sources of income.	300		Target has been achieved now.
Number of artisans in Vanuatu fabricating EE cook stoves as their main source of income	20		Target has been achieved now. The indicator is only moderately specific and relevant to the outcome as it does not take into account the capacities of consumers for repairing and maintaining EE cook stoves for reuse.

Outcome 2: Improved policy, planning, and regulatory regimes in the application of sustainable energy, energy access, and low carbon development in the energy, public, private, and residential sectors			
Portion of nation's off-grid villages for which a comprehensive electrification plan has been determined , %	100		This indicator has been successfully achieved now.
Number of regulations under the Off-Grid Rural Electrification Policy that are enforced	5		This indicator is likely to be achieved within the project timeframe as the stakeholders are keenly working towards it.
Outcome 3: Established institutional framework enables the effective enforcement of policies and regulations, and implementation of plans, programs, and projects, on the application of sustainable energy and low carbon technologies.			
Number of pico-/ small micro-hydro, village community PV, and village sets of family compound-scale nano-grid sites at which management model enables fee collection, savings for repairs/ parts, and payment of operator	40		This indicator is moderately achievable within the project timeframe.

Number of villages at which DOE has cooperated with other national-level departments to implement rural electrification or EE cook stoves, as well as productive uses of RE/EE applications, if relevant	60		This indicator has been successfully achieved now.
Outcome 4A: Increased availability of, and access to, financing for sustainable energy, energy access, and low carbon initiatives in the energy supply and demand sectors			
Amount of new international funding confirmed with funding entities for infusion into NGEF because of BRANTV efforts, US$ million	10		This indicator is moderately achievable within the project timeframe. Relevance to the overarching objective of the component is also limited as grant funding from international sources do not enable sustainable access to funds for RE and EE projects.
Outcome 4B: Increased financing and investments from private sector on sustainable energy and low carbon projects in the energy supply and demand sectors			

Amount of funding represented by financial closes reached for loans or direct equity investments to RE and EE projects under commercial or private sector financing scheme for low carbon projects, US$ million			This indicator is moderately achievable. Furthermore, there needs to be clarity on whether the volume of transactions or the value of transactions is used as a measurable target.
Outcome 5A: Sustainable energy and low carbon (RE and EE) techniques and practices adopted and implemented with both cost and technical viability in the energy, public, private sector, and residential sectors			
Number of types of key off-grid RE power generation and mini-grid related equipment/ parts newly available or available at 25% or more less than cost at start of project	8		Under the particular project component, indicator measuring technical viability of RE and EE techniques is also highly relevant, however omitted.
Outcome 5B: Enhanced confidence in the economic and technical viability and long-term sustainability of sustainable energy and low carbon technology projects			

No. of communities and private sector entities, and households in both on-grid and off-grid areas that are interested in replicating the RE-based power generation system, and EE cook stoves and RE-powered freezer demos: • Pico-/ small micro-hydro • Hybrid pico-hydro & PV • Village community PV (with or without mini-grid) Village-wide family compound-scale PV nano-grids • EE cook stoves • RE-powered freezers	• 38 • 2 • 20 • 20 • 12,000 • 60							The indicator is only moderately specific to the outcome level impact. Interest of individuals is subjective. The indicator can be made more specific by looking at expenditure towards RE and EE systems by households and private sector entities.

Table 5: Analysis of the result indicators against the SMART - Specific, Measurable, Achievable, Relevant & Timebound

Gender Responsiveness of Project Design

In addition to the Developing the National Green Energy Fund Resource Mobilization and Institutional Sustainability Plan in 2020, the BRANTV PMU further had supported the negotiations of Vanwods Women microfinance scheme to access the financial loans offered by NGEF towards RE and EE systems. UN Women had supported the Vanwods to co-finance 50% of lending offered to 100 members of the Vanwods towards RE Solar systems for their small businesses.

4.3.1 Progress towards objective and expected outcomes (*)[2]

The following are the TE findings related to progress towards results by component, outcome, and outputs, as per the latest developments:

Red: Not on Target to be Achieved	**Yellow:** On Target to be Achieved	**Green:** Achieved
AR = Achievement rating - Progress towards results rating scale: Highly satisfactory (HS); Satisfactory (S); Moderately satisfactory (MS); Moderately unsatisfactory (MU) Unsatisfactory (U); Highly unsatisfactory (HU).		

Indicator	End of Project (EoP) Targets	Cumulative progress Reported by the Latest Documentation	TA		AR	xx	TE Comments
Objective: Enabling the achievement of the energy access, sustainable energy, and green growth targets of Vanuatu							
Cumulative tons of incremental GHG emissions reduced from business as usual (tons CO2)	45,016.1 tons CO2	6220 This is a cumulative result of GHG ER from 23 demo sites of Community Scale PV Solar systems and 1 installation of Pico-hydropower PV Solar hybrid mini-grid system. Installation updated to December 2023. The difference on the 2023 target and actual is based on the calculation of GHG emissions of Lolowai			MU		It will be difficult to achieve the target, as any reduction through cook stoves would not be sufficient to cover the anticipated significant change. Furthermore, most installations are in areas which were off-grid, so it won't be reduction in GHG emissions, but it will reduce the net

[2] This evaluation is based on the data received after the extension of the project from July 2023 to January 2024, as there have been targets, which were thus achieved or are close to their achievement due to the time provided.

		hospital which was calculated based on the Kwh for the batteries (300Kwh). The actual is calculated based on the panel capacity which is 50,000W (50kW).					addition to GHG emissions. Substantially more needs to be done into moving the existing grid users to renewables, including roof-top solar, net metering, and bio-fields before the potential targets can be achieved.
Incremental number of households (w/ at least 20% women-headed) in rural areas whose level of energy access is increased via village-scale off-grid RE or that benefit from newly adopting EE cook stoves	14,000	3910 RE–2,994 EE –166 +750 = 916 Total of 3,910. Target was not achieved due to 12,000 EE cook stove target not achieved			M U		The target cannot be achieved with existing infrastructure mainly because of the sparse nature of communities, and households. Much more needs to be done in terms of rolling out hydro-solar hybrids, and scaling up of community solar to micro-grids before the same can be done. The target was very ambitious,

							and effectively covered one-fifth of the country's population. It can only be achieved if existing areas with electricity also move towards renewables
Total new, incremental reductions in or newly avoided amounts of annual diesel consumption achieved, liters DFO	272,212	110,859.30 Litres DFO The 2023 target was based on the calculation of Lolowai from the battery capacity of 300kWh. The actual reading is taken from the panel capacity of 50kW.			MS		There is a possibility to achieve this, despite significant diesel usage is in areas with existing grid connections, and supply. There needs to be a national campaign to move existing connections to renewables through a mix of rooftop solar, bio-fuels, and net metering to achieve the goal
Incremental fuel wood saved annually by use of energy efficient cook stoves, million kgs	15.6	0			HU		Resulted from 166 EE cook stoves. Another 750 EE cook stoves still in process of manufacturing

Component 1: Capacity and Awareness Enhancement on Sustainable Energy and Low Carbon Development **Outcome 1.** Improved capacity and awareness on sustainable energy, energy access, and low carbon development in the energy, public, private, and residential sectors						
Number of individuals (with at least 30% being women) in Vanuatu that are newly (as of start of project) involved in operating, maintaining, repairing, designing, and/or installing off-grid rural RE power systems as one of their main sources of income.	300	319 Note: out of this 13% are women.		HS		RE – 291 EE – 28 Out of the overall total 13% being women.
Number of artisans in Vanuatu fabricating EE cook stoves as their main	20	28 Note: The procurement of		HS		This target is achieved more than the assumed end of target as a total of 28 artisans have been

source of income		expert is in process.				trained and qualified. They are currently producing EE cook stoves in their respective communities and sell to the public making extra income for their families.
Component 2: Improvement of Energy Policy and Planning Formulation and Implementation **Outcome 2.** Improved policy, planning, and regulatory regimes in the application of sustainable energy, energy access, and low carbon development in the energy, public, private, and residential sectors						
Portion of nation's off-grid villages for which a comprehensive electrification plan has been determined, %	100	2000 Note: The New Zealand Ministry of Foreign Affairs (MFAT) had co-financed the activity with NZ500,000 to develop the National Electrification Master Plan. BRANTV will be able to achieve its targets of 100 off-grid villages to be determined under NEMP with funding availability through NZ MFAT.		HS		100% The Rural Off Grid Electrification Master Plan had determined plan for the entire country of Vanuatu.
Number of regulations under the Off-Grid Rural Electrification Policy that are enforced	5	4 1. Vanuatu Off Grid Rural Electrification Master Plan 2. National Guidelines		HS		Regulations under Off-grid Rural Electrification Policy being implemented or enforced.

		and standards for Small Hydro Mini Grid and Village PV Systems 3. Policy and Regulatory Framework for Off Grid Rural Electrification in Vanuatu and Guidelines 4. The Waste Management Act was coordinated by the Department of Environment and was launched on 16th June 2023. The Investment policy is not developed since it will be seen as a duplicate of NGEF Act. consultant. Currently, the process is pending BRANTV funding to be available and reported from the Vanuatu Government Finance system. Once BRANTV funds is available in the Government system this will enable finalizing procurement process and begin with implementing the activities of NEMP.				
Component 3: Institutional Framework Enhancement for Sustainable Energy and Low Carbon Development **Outcome 3.** Established institutional framework enables the effective enforcement of policies and regulations, and implementation of plans, programs, and projects, on the application of sustainable						

energy and low carbon technologies						
Number of pico-/ small micro-hydro, 7village community PV, and village sets of family compound-scale nano-grid sites at which management model enables fee collection, savings for repairs/ parts, and payment of operator	40	37 Total of RE systems installed in 37 communities. 1 – Pico-hydro PV solar hybrid mini grid system 1 – Family compound PV solar Nano Grid 35 – Community Scale PV solar system The management systems for all BRANTV demo sites were initiated during the conduct of the ESIA and again during the conduct of the economic and technical feasibility studies – site inspections. This is reported in the Back to office (BTOR) reports presented upon returning from the site inspections. This community energy committee set up supports the Vendors during installation of the systems. Further the Energy committee supports with recommending the		HS		While this target has been significantly achieved (More than 90%), it seems highly unlikely that it would now be fully achieved in the course of the project.

		local technician to attend the training of solar systems. The 23 communities that have RE community scale PV solar systems installed have their management committee established to collect fees for using the electricity. Refer to attachment. Currently the collection of fees is not regulated. This is waiting formulation of the NEMP to recommend the type of regulations suitable for these RE solar types and management model. The pico-hydro power PV solar hybrid mini-grid installation is regulated, and the tariff was issued by the Utility Regulatory Authority (URA) and gazetted by the State Law office dated 16th June 2022. The management of the mini-grid is oversight by the Department of energy waiting on the formal establishment of the community business management					

		model to enable a transfer of management from the Vanuatu Government (DOE) to the new operator the Loltong Community Management Model. Copy of tariff issued by URA is provided.					
Number of villages at which DOE has cooperated with other national-level departments to implement rural electrification or EE cook stoves, as well as productive uses of RE/EE applications, if relevant	60	953 Some of these PV solar sites installed by NGEF were made possible by the BRANTV from requests received from clients and community and forwarded to NGEF. Further the report on NGEF Resource Mobilization and Institutional Sustainability Plan funded by BRANTV contributes to NGEF progress on RE PV solar installations. Based on this same report, BRANTV is assisting NGEF to sign another agreement with members of Vanwods to engage in the lending scheme for RE solar systems. Vanwods has forwarded a list of registered clients to			HS		37 productive uses for 37 RE project sites 916 –EE cook stoves Total of 953 villages

		NGEF in which NGEF is now seeking grant funding to subsidize cost of the equipment for the Vanwods members.				
Component 4: Sustainable Energy and Low Carbon Initiatives Financing **Outcome 4A.** Increased availability of, and access to, financing for sustainable energy, energy access, and low carbon (RE and EE) initiatives in the energy supply and demand sectors **Outcome 4B.** Increased financing and investments from private sector on sustainable energy and low carbon projects in the energy supply and demand sectors						
Amount of new international funding confirmed with funding entities for infusion into NGEF because of BRANTV efforts, US$ million	10	VUV 563,020,145 USD 4,879,280.22 (Exchange Rate: 115.39)		MS		The figures show total funding invested into National Green Energy Fund (NGEF) from international sources between the year of 2021 and 2023. The projected total amount of new international funding confirmed is USD 4,922,611.53. Another request of 15 million USD requested from GCF funds through the Simplified Approved Process (SAP) has been launched and

							pending confirmation. This application was submitted to fund over 300 requests from the Vanwods members, a working collaboration between BRANTV and NGEF.
Amount of funding represented by financial closes reached for loans or direct equity investments to RE and EE projects under commercial or private sector financing scheme for low carbon projects, US$ million	4	0 The NGEF had made efforts to implement the recommendations of the Resource Mobilization and Institutional Sustainability Plan to engage private sectors and commercial banks to engage in the lending scheme for RE generations. However, the initiatives encountered challenges with interests' rates computed to be higher than the rate offered by NGEF. This had made it difficult for NGEF to pursue going forward with the recommendations.			HU		No private capital could be sourced for the project. However, there exists potential to crowd source capital through effective restructuring of some of NGEF offerings, such as guarantee programs, and interest rate subsidies. Similarly, URA through an upfront tariff mechanism with adequate investor protection and returns can also crowd-in private capital for effective scale-up of renewable projects.

Component 5: Sustainable Energy and Low Carbon (RE and EE) Technology Applications **Outcome 5A.** Sustainable energy and low carbon (RE and EE) techniques and practices adopted and implemented with both cost and technical viability in the energy, public, private sector, and residential sectors of the country. **Outcome 5B.** Enhanced confidence in the economic and technical viability and long-term sustainability of sustainable energy and low carbon technology projects						
Number of types of key off-grid RE power generation and mini-grid related equipment/ parts newly available or available at 25% or more less than cost at start of project	8	37installations updated to June December 2023. So far, a total of 37 sites of Community Scale PV solar systems have benefited from the VREP standards and Duty exemption applied to the Project. 1 of Pico-Hydropower mini-grid systems have also benefited from the exemption on duty and VAT applied to the project and free labour provided by the community of Loltong. The community's free labour, supply of tools and materials to build the mini-grid had contributed to less cost to build the mini-grid. The support from		HS		Most installations were community scale demo activities, which need to be upgraded to micro or mini grids for these to be more scalable.

		the community had contributed to less costs in the following areas: • Free labor to digging trenches, haul cables, backfilled, • Free labor to clearing of penstock route, haul penstock, • Free labor and materials to construct 2 power houses • Supply of sand and coral for constructions Supply of food to feed community works and labour provided by the DOE. The family compound nano-grid that was procured end of 2021 and installation done in Q3 of 2022 has also procured using VAT exemption certificate issued for the BRANTV project. The construction of power houses was built by the community labor including trenching of cable routes from power generations to households.				

No. of communities and private sector entities, and households in both on-grid and off-grid areas that are interested in replicating the RE-based power generation system demos: • Pico-/ small micro-hydro • Hybrid pico-hydro & PV • Village community PV (with or without mini-grid) • Village-wide family compound-scale PV nano-grids • EE cook stoves. • RE-powered freezers	• 38 • 2 • 20 • 20 • 12,000 • 60	Pico-Hydro - 0 Hybrid pico-hydro& PV - 1 Village community PV solar - 23 Family compound Nano-grid PV solar - 1 in progress EE cook Stoves - 0 RE-powered freezers - 28			MS		Pico-Hydro – 10 with Feasibility report & 4 with detailed designs Hybrid pico-hydro & PV - 1 Village community PV solar - 35 Family compound Nano-grid PV solar - 1 EE cook Stoves – 166 another 750 in progress

Table 6: Progress Results According to Component, Outcome and Outputs

Overall Project Outcome

The overall effectiveness of the project relative to its targets remains satisfactory, as there is a possibility to meet most targets. The project is relevant to address the energy needs of the country and is effective and efficient because of the targets achieved. This can be observed as many targets, which had a very thin chance of achievement until June, were able to emerge as achievable by January 2024. While this does not translate into absolute progress, given the circumstances, the efforts for the project must be lauded. The current transition of existing generation capacity should be taken into consideration and there should focus on more on scalable solutions instead such as micro-grids, crowding-in private sector capital, rather than relying solely on donor capital.

Assessment of Outcomes	Rating
Relevance	Highly Satisfactory (6)
Effectiveness	Satisfactory (5)
Efficiency	Satisfactory (5)
Overall Project Outcome Rating	Satisfactory (5)

Findings:

- Pico-Micro Hydro Mini Grids and Pico-Micro Hydro PV Solar Hybrid Mini Grid are new terminologies and new technology in the region. The supply chain of materials and equipment is limited too so as the expertise with wealth of experience in designing and building is limited to not available at all both locally and in the region. Thus, it is worth considering implementing several hydro mini- grids of this scale and to be in operations for several years will surely provide substantial and concrete information to draw on its lessons learnt of the model, band and type of material and equipment suitable for the country. Furthermore, building mini grids requires more time to design and collecting important data such as water flow rates and rainfall data.

- The Technical Working Group (TWG) were supportive towards the project implementation, providing guidance and advice with processes and technical knowledge of their presence in the community of the project sites. The TWG assisted with project implementation.

- Women attending the RE and EE training has resolved the ongoing issues in the communities where young strong men are leaving for seasonal works in Australia and New Zealand and women have to use their knowledge they acquired to trouble shoot the problem and fix it or advice of the next step.

- Government implemented projects have their advantage of having to choose from two different systems at times when required for the benefit of the project and the beneficiaries. Example is with procurement processes and finances.

- The first attempt for encouraging Commercial Banks to finance RE in their lending scheme was not successful due to high interests loans offered by Commercial Bank compared to limit offered by NGEF. Thus, commercial Banks hinders proceeding further. Thus, the subsidy proposal offered by NGEF with Donor providing grant to meet cost of subsidy was successful. There is lesser financial burden imposed on the consumers.

- Community Scale projects have a considerable social and environmental impact on the community especially in terms of constructing project sites. Even though electricity does not reach to individual households, there is access for community events and charging which means that the residents have access to power to carry out more activities despite not having access at their homes

Building mini-grid using hydro technology is cost efficient compared to using PV solar systems. This is because unlike solar that is dependent on the timings when the sunlight is maximum, hydro can be utilised without any limitations on the timings. Due to this, solar requires far more battery than hydro

so in hydro one can get more electricity with less battery consumption. Other benefits associated such as continuous supply of electricity during long-term challenging weather conditions.

Lessons Learned

- The Government Contracts and Tenders Act guides the decision and process and procedures to be undertaken.
- Stakeholders especially Government and UNDP must be informed of the possible delays in the planning due to disasters.
- Seek the support of UNDP and Ministry to recruit international expertise specifically for Pico-Micro hydro technologies.
- BRANTV PMU and DOE were part of the Waste Management policy led by the Department of Environment to regulate waste management including energy to ensure that communities remain safe.
- Escalation of Issues needs to be done during the Board meeting, discussions with stakeholders URA and NGEF for their interventions. URA has plans to create a force majeure funds from Utilities towards meeting costs of damage caused by force majeure events. NGEF will include BRANTV project sites in their disaster recovery plans.
- The Project Manager to sign a new contract to offer assistance and support to the Department of Energy (DoE) and United Nations Development Programme (UNDP) until July 2024, particularly during the financial closure. The Project Manager should possess comprehensive knowledge of the project from its initiation to its conclusion, and would work closely with the Vanuatu Government and DoE to secure funding for ongoing support from government funding sources in Vanuatu.
- The position of the Technical Advisor on the BRANTV PMU structure is missing and must be included for any future energy projects.