



# Technical Assistance Report

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Project Number: 45274  
Capacity Development Technical Assistance (CDTA)  
December 2012

## Republic of Indonesia: Scaling Up Renewable Energy Access in Eastern Indonesia (Financed by the Multi-Donor Clean Energy Fund under the Clean Energy Financing Partnership Facility)

## CURRENCY EQUIVALENTS

(as of 12 December 2012)

Currency unit	–	rupiah (Rp)
Rp1.00	=	\$0.000107
\$1.00	=	Rp 9,635.00

## ABBREVIATIONS

ADB	–	Asian Development Bank
BAPPENAS	–	Badan Perencanaan dan Pembangunan Nasional (National Development Planning Agency)
Hivos	–	Humanist Institute for Development Cooperation
IPP	–	independent power producer
MEMR	–	Ministry of Energy and Mineral Resources
MW	–	megawatt
NTT	–	Nusa Tenggara Timur
PLN	–	Perusahaan Listrik Negara (State Electricity Company)
TA	–	technical assistance

## TECHNICAL ASSISTANCE CLASSIFICATION

<b>Type</b>	–	Capacity development technical assistance (CDTA)
<b>Targeting classification</b>	–	Targeted intervention (household)
<b>Sector (subsector)</b>	–	Energy (renewable energy)
<b>Theme (subthemes)</b>	–	<b>Environmental sustainability</b> (global and regional transboundary environmental concerns), economic growth (promoting macroeconomic stability), capacity development (institutional development)
<b>Location (impact)</b>	–	Rural (high), urban (low), national (medium), regional (low)
<b>Partnerships</b>	–	Multi-Donor Clean Energy Fund under the Clean Energy Financing Partnership Facility

## NOTE

In this report, “\$” refers to US dollars.

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## I. INTRODUCTION

1. This capacity development technical assistance (TA) will support the Ministry of Energy and Mineral Resources (MEMR), the provincial government of Nusa Tenggara Timur (NTT), and the local government of Sumba Island to design and implement energy access programs based on renewable energy sources. The TA addresses key priorities elaborated in the Asian Development Bank's (ADB) energy sector assessment, strategy and road map for Indonesia (ASR), namely: improving access to reliable sources of power in rural areas, and expanded use of renewable energy. It will directly contribute to the two pillars of the Indonesia country partnership strategy, 2012–2014: (i) inclusive growth, and (ii) environmental sustainability with climate change mitigation and adaptation.<sup>1</sup> The TA is included in the ADB's country operations business plan, 2012–2014.<sup>2</sup> The scope, expected impact, outcome, outputs, and implementation arrangements were discussed with the government and finalized during a TA fact-finding mission in July 2012. The design and monitoring framework is in Appendix 1.<sup>3</sup>

## II. ISSUES

2. Indonesia lags behind its neighbors in terms of access to energy for its citizens. In 2011, an estimated 68% of the total population in Indonesia has access to electricity or modern forms of energy.<sup>4</sup> The electrification ratio is considerably less in rural areas—as low as 30% in some provinces. Further, about 46% of the population living in rural and remote parts, including small islands, have no access to modern cooking fuels, and are dependent on traditional forest-based biomass. Lack of access to electricity and modern forms of energy, and the resultant reliance on traditional biomass, has corresponding negative impacts on forests, indoor air quality, and prospects for improved livelihoods.

3. With the support of international development partners, the government experienced early success in implementing its electrification programs. Starting with an initial electrification baseline of 2% in the mid-1970s, the government was able to sustain an electrification rate of 1 million households per year through the 1990s. The 1997 financial crisis led to a drastic slow down in rural electrification programs. Since 2000, the government has pursued rural electrification initiatives through MEMR<sup>5</sup> and the State Electricity Company (PLN), with the support of local governments and nongovernment organizations. However, the relatively high cost of providing energy access in rural areas, inadequate institutional capacity, lack of coordination among implementing agencies, and absence of the private sector have stymied progress and current annual rate of electrification is lower than what is required to assure universal access to energy in the medium-term. This is particularly the case for small islands and remote areas in Eastern Indonesia.

4. Development partners and nongovernment organizations have been involved in modest scaling up energy access in Indonesia with mixed success. The United Nations Environment Programme launched its solar lighting partnership program in 2010,<sup>6</sup> and several vendors

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<sup>1</sup> ADB. 2012. *Country Partnership Strategy: Indonesia, 2012–2014*. Manila.

<sup>2</sup> ADB. 2012. *Country Operations Business Plan: Indonesia, 2012–2014*. Manila.

<sup>3</sup> The TA first appeared in the business opportunities section of ADB's website on 1 November 2012.

<sup>4</sup> ADB. 2012. *Energy Sector Assessment, Strategy and Roadmap: Indonesia*. Manila.

<sup>5</sup> Notable among the government's small-scale renewable energy programs is the domestic biogas program. The program—focused on small-scale livestock owners in areas where wood fuel is becoming scarce—was initiated in 2009 in four provinces in Java and has been extended to two more provinces. The program will have successfully installed over 8,000 domestic biogas digesters by the end of 2012. The government has indicated that it is interested in scaling up this effort to install 26,000 digesters under the Program's second phase during 2012–2015.

<sup>6</sup> United Nations Environment Programme. <http://www.unep.org/>

offering small wind, solar lanterns, and improved cook stoves have set up operations in the country. A micro-hydropower program financed by the German government has been active in the country for over a decade and has supported several installations and the establishment of turbine manufacturing and maintenance industry.

5. Several developments have coalesced to improve the prospects for expanding rural energy access in Indonesia. Recognizing the strong link between improved energy access and prospects for poverty alleviation and inclusive economic growth, and as a member of the Group of Twenty (G20) nations, Indonesia has reinstated expanding access to energy as a national priority. The provision of energy access is addressed by a range of policies such as Law 30/2009 that makes access to energy a right, Law 30/2007 that obligates the government to provide energy access in remote areas and in post-disaster contexts, and Presidential Decree 5/2006 that mandates that renewable resources should provide 17% of the total national energy mix by 2020. Further, in terms of pricing, a ministerial regulation (MEMR 31/2009) directs PLN to pay a higher tariff to purchase power from small producers (up to 10 megawatts). The government has set a target of attaining an electrification ratio of 90% by 2020. MEMR has also established a directorate general for new and renewable energy that oversees biogas, and small-scale renewable energy generation.

6. In terms of resource endowment, Indonesia has an abundance of renewable energy sources including solar, hydropower, and geothermal. The government's renewed commitment to enhancing rural energy access also dovetails with significant cost reductions in renewable energy technologies, and improvements in financing and institutional models that have helped make renewable energy for off-grid and on-grid application more sustainable. In contrast, fossil fuels have become more expensive, are linked to both local air pollution and global greenhouse gas emissions, and are no longer attractive options to provide electricity to rural and remote areas. Encouraging the adoption of economically sustainable renewable energy alternatives simultaneously addresses energy poverty and climate change. Depending on the renewable energy resources that are developed, positive social impacts could include welfare improvements for women and children, increased local enterprises and diversification of livelihoods, and a lowering of indoor air pollution-related illnesses (from the use of traditional biomass).

7. In 2011, as part of a regional initiative, the Asian Development Bank (ADB) undertook a scoping study to (i) assess the potential for increasing energy access using off-grid renewable energy, (ii) identify innovative technologies, (iii) examine different institutional models, and (iv) outline possible financing approaches.<sup>7</sup> The scoping analysis concluded that MEMR, owing to its mandate to oversee all energy-related programs in the country, is ideally positioned to direct and coordinate implementation of the energy access programs. It also highlighted the need to create a more conducive and enabling environment for local and regional banks and independent power producers (IPPs) to bring in additional resources and expertise. Finally, the analysis noted that local governments in the focus areas have gained considerable financing and implementation responsibility as part of the government's decentralization efforts, and would need to be integrated into the implementation of specific programs. In March 2012, MEMR requested ADB to provide TA support for promoting energy access through increased use of renewable energy, with a special focus on remote areas and small islands in eastern Indonesia.

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<sup>7</sup> ADB. 2010. *Technical Assistance for Empowering the Poor through Increasing Access to Energy*. Manila. The regional TA was financed by the Asian Clean Energy Fund and covered Bangladesh, Bhutan, Cambodia, Indonesia, the Lao People's Democratic Republic, Nepal, Pakistan, and the Philippines.

8. Based on discussions with MEMR, the area chosen for the TA is the NTT region of Indonesia (with a focus on Sumba Island). A study conducted by the Netherlands nongovernment organization Humanist Institute for Development Cooperation (Hivos) demonstrates that, through proper utilization of indigenous resources, it is technically feasible to meet more than 90% of the energy demands of Sumba through renewable energy.<sup>8</sup> The TA will build on early resource surveys and economic analyses conducted in Sumba.<sup>9</sup> The provincial government of NTT and the district governments of Sumba (comprised of four districts) are pursuing energy access programs jointly with MEMR and the regional office of PLN, and have designated Sumba an “iconic island” that will have universal energy access from renewable energy sources. In addition, a few small-scale IPPs are active in the region. Commercial banks that operate on the island have also indicated an interest in participating in energy access programs.

9. A focus on Sumba and NTT allows the TA to build on prior work and provides an ideal implementation context with several interested stakeholders. MEMR has constituted a task force to scale up renewable energy generation in Sumba and all stakeholders are task force members. The TA will align its scope and work plan with that of the task force and support its objectives.

### **III. THE TECHNICAL ASSISTANCE**

#### **A. Impact and Outcome**

10. The impact will be increased access to energy in the NTT region of Indonesia. The outcome will be improved capacity within MEMR, PLN, the regional government of NTT, and the local governments of Sumba to design and manage rural energy access programs using renewable energy resources.

#### **B. Methodology and Key Activities**

11. The TA will build on the preliminary work that has been undertaken in Sumba and support the future activities of the task force set up by the stakeholders. The key outputs of the TA will include (i) developing a detailed energy access plan for Sumba, (ii) identifying and preparing at least three priority investment projects to be developed by small IPPs, and (iii) strengthening the implementation of ongoing and planned energy access programs financed by the government.

12. The TA will undertake the following activities in the targeted areas:

- (i) Strengthen the capacity of the local governments for planning energy access programs in off-grid areas including (a) surveys of resource availability; (b) willingness to pay for energy; (c) assessment of renewable energy technology, and appraisal and financing of renewable energy projects; and (d) community engagement and private sector participation.
- (ii) Support the development of at least three mini-grid projects involving small IPPs, including facilitating their access to finance from commercial banks.
- (iii) Review ongoing government programs for energy access, and pilot test improvements relating to cost recovery and financing, installation and operation and maintenance of renewable energy hardware, community engagement, and private sector participation.

<sup>8</sup> Hivos. 2011. *Sumba: An Iconic Island to Demonstrate the Potential of Renewable Energy*. The Hague.

<sup>9</sup> Winrock International. 2010. *Fuel Independent Renewable Energy “Iconic Island”—Preliminary Resource Assessment: Sumba and Buru Islands, Indonesia*. New York.

## C. Cost and Financing

13. The TA is estimated to cost \$1,100,000, of which \$1,000,000 equivalent will be financed on a grant basis by the Multi-Donor Clean Energy Fund<sup>10</sup> under the Clean Energy Financing Partnership Facility, and administered by ADB. The government will provide counterpart support in the form of staff time, office space, staff travel costs, and other in-kind contributions. The cost estimates and financing plan are in Appendix 2.

## D. Implementation Arrangements

14. MEMR will be the executing agency (EA). The provincial government of NTT (based in Kupang) will be the implementing agency. Making the provincial government the implementing agency (IA) allows for better coordination among the four district governments that have jurisdiction over Sumba. Within ADB, the TA will be managed by the Southeast Asia Energy Division through the Indonesia Resident Mission with support from the regional TA for Empowering the Poor through Increasing Access to Energy.<sup>11</sup> To support the Sumba iconic island program, MEMR has constituted a task force comprising officials from headquarters, the regional office in Kupang (NTT), the provincial government of NTT, the district governments of Sumba, and PLN's national and regional offices. The task force has set up a multi-year work plan with associated activities. ADB will align its TA work plan with that of the task force. This task force will also have representation from the Ministry of Finance and the National Development Planning Agency (BAPPENAS) and will serve as the steering committee and oversee TA design and work plan implementation, and review and endorse TA outputs.

15. The TA will be implemented over 2 years, commencing in January 2013 and ending in December 2014. About 131 person-months of consulting services (18 person-months of international consultants and 113 person-months of national consultants) will be engaged through a firm. The international consulting firm, together with the national consultants, will be hired through quality- and cost-based selection (quality–cost ratio of 90:10) on the basis of a full technical proposal. The international consultants will include the following: (i) renewable energy specialist—team leader, (ii) distribution engineer, (iii) micro hydro specialist, (iv) small wind energy specialist, (v) renewable energy finance specialist, (vi) procurement specialist, and (vii) capacity development specialist. National consultants will have expertise that complements the international experts and support them in their work. The national team will also include (i) a carbon finance specialist, (ii) community development facilitators to help with project implementation and ongoing community engagement, and (iii) an office manager. The terms of reference for consultants are outlined in Appendix 3. Additional TA resources may become available after inception, which would allow an expansion of the scope of the consultant's contract to carry out additional surveys and investigations on the introduction of other renewable energy technologies.<sup>12</sup> Therefore, in addition to the renewable energy technologies identified above, the selected firm should be able to demonstrate expertise in other areas such as solar photovoltaics, biogas, and liquid biofuels for small-scale power generation, all of which may be considered for inclusion in an expanded terms of reference in the future. All TA disbursements will be done in accordance with ADB's *Technical Assistance Disbursement Handbook* (2010, as

<sup>10</sup> Contributors: the governments of Australia, Norway, Spain, and Switzerland.

<sup>11</sup> ADB. 2010. *Technical Assistance for Empowering the Poor through Increasing Access to Energy*. Manila. The regional TA was financed by the Asian Clean Energy Fund and covered Bangladesh, Bhutan, Cambodia, Indonesia, the Lao People's Democratic Republic, Nepal, Pakistan, and the Philippines.

<sup>12</sup> Should these resources become available, the contract awarded under the current terms of reference may be revised during implementation to include follow-on surveys, investigations, and consideration of additional renewable energy alternatives.

amended from time to time). All equipment will be procured following ADB's Procurement Guidelines (2010, as amended from time to time), and will be turned over to the EA upon TA completion.

16. The district government of Southwest Sumba, on behalf of the four districts that comprise Sumba, will provide an office for the TA consultants in Tambolaka town along with the requisite utilities. The district governments in Sumba and the regional government of NTT will provide access to relevant data and information. Hivos will also provide access to the baseline information and resource surveys that have been conducted.

#### **IV. THE PRESIDENT'S DECISION**

17. The President, acting under the authority delegated by the Board, has approved ADB administering technical assistance not exceeding the equivalent of \$1,000,000 to the Government of Indonesia to be financed on a grant basis by the Multi-Donor Clean Energy Fund under the Clean Energy Financing Partnership Facility for Scaling up Renewable Energy Access in Eastern Indonesia, and hereby reports this action to the Board.

**DESIGN AND MONITORING FRAMEWORK**

<b>Design Summary</b>	<b>Performance Targets and Indicators with Baselines</b>	<b>Data Sources and Reporting Mechanisms</b>	<b>Assumptions and Risks</b>
<b>Impact</b>  Increased access to energy in the NTT region of Indonesia	About 15 MW of new small-scale renewable energy capacity installed <sup>a</sup>  0.75 million households (and public facilities) obtain access to modern forms of energy by 2020 (2012 baseline: 15 million households do not have access to energy)  Local governments make financial provisions and organizational commitments in their annual budgets to expand energy access.	Government statistics.  Surveys by independent agencies such as nongovernment organizations, and United Nations agencies  Annual budget activity reports for local governments and MEMR	<b>Assumption</b>  MEMR retains its mandate to develop community-oriented energy access programs and is strengthened with time  <b>Risk</b>  Government decides to replace community-driven program in favor of grid-extension by PLN.
<b>Outcome</b>  Improved capacity within MEMR, PLN, the regional government of NTT, and the local governments of Sumba to design and manage rural energy access programs using renewable energy resources	At least three mini-grids or grid-connected (totaling about 2 MW) generation facilities to be developed by small IPPs reach financial closure by 2015.  A pipeline of projects is prepared by IPPs and the local governments for possible financing from the government's resources or from commercial sources (local and regional banks).	Government statistics  MEMR reports  Knowledge products:  Review of policy and financing options for promoting energy access in Indonesia  Report on renewable energy resource assessment in Sumba Island  Report on strengthening publicly funded programs for off-grid renewable energy deployment in rural Indonesia  National Development Planning Agency (BAPPENAS) reports	<b>Assumptions</b>  MEMR maintains rural electrification as a priority agenda  Local government financing earmarked for community-driven development programs  Local and regional banks become interested in lending for rural and energy access projects  <b>Risks</b>  Lack of commercially viable renewable energy resources  Financing for rural electrification not available through the government.
<b>Outputs</b>  1. Detailed energy access plan for Sumba developed	Detailed renewable energy resource survey and possible energy access delivery models are produced by the consultants and endorsed by the local government and MEMR by 2014	Project monitoring, progress, and final assessment reports: (i) review of policy and financing options for promoting energy access in Indonesia, and (ii) detailed renewable energy survey in focus areas.	<b>Assumptions</b>  Timely access to data and relevant key personnel in the priority areas  MEMR and other stakeholders effectively participate in technical assistance implementation  Effective collaboration and information sharing among



Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
<p>2. Investment projects to be developed by small IPPs prepared</p> <p>3. Implementation of ongoing and planned energy access programs financed by the government strengthened</p>	<p>Final project designs, power purchase agreements, financing plans, and implementation plans for three mini-grid investments are endorsed by local governments and PLN by 2014.</p> <p>Suitable financing models, procurement plans, community engagement models that involve women, and tariff recovery and revenue management programs are designed and tested by 2014.</p> <p>At least two local or regional banks initiate their own energy access finance programs, including those that expand livelihood programs for women.</p> <p>At least two pilot projects for promoting community-scale off-grid programs are designed, including financing, hardware specifications, procurement plans, and community engagement by 2014</p> <p>At least 50 staff (from MEMR and the local governments) enhance their capacity in procurement, financial management, community development, and safeguards; and project implementation delays are reduced by 25%. At least 25% of the trainees will be women. Ex-ante and ex-post surveys will be conducted to evaluate the degree of capacity enhancement by 2014.</p> <p>Local equipment vendors, installers, and service providers are identified and trained in operation and maintenance.</p>	<p>Project feasibility reports Letters of financial support from commercial lenders in Indonesia</p> <p>Report on strengthening publicly funded programs for off-grid renewable energy deployment in rural Indonesia</p> <p>Training and development feedback forms Workshop documentation</p> <p>Post-installation reports and consumer user survey documentation</p>	<p>stakeholders</p> <p>Banks remain interested in financing energy access projects.</p> <p><b>Risks</b></p> <p>Change in MEMR priorities resulting in possible lack of interest</p> <p>Weak and commercially nonviable pilot delivery models</p>
<p><b>Activities with Milestones</b></p> <p><b>1. Detailed energy access plan for Sumba developed</b></p> <p>1.1. Review existing surveys and conduct new physical surveys (as appropriate) of all applicable renewable energy resources (e.g., small wind, solar, micro hydro and biomass) including power density, availability, total electricity potential, and costs (January 2013–May 2013)</p> <p>1.2. Assess energy demand, current fuel supply and access to energy, willingness to pay, and feasibility of cost sharing and recovery schemes such as microfinance, sweat equity, and output-based aid</p>		<p><b>Inputs</b></p> <p><b>Multi-Donor Clean Energy Fund under the Clean Energy Financing Partnership Facility: \$1,000,000</b></p>	

Activities with Milestones	Inputs	
	Item	Amount (\$'000)
<p>(June 2013–September 2013).</p> <p>1.3. Draft and final version of report on energy plan for Sumba and proposed energy access program delivery models.</p> <p><b>2. Investment projects to be developed by small IPPs prepared</b></p> <p>2.1. Identify locations to be developed for the project (June 2013–November 2013), in consultation with local government, PLN, and the small IPPs.</p> <p>2.2. Determine the optimal combination of renewable energy technologies to deliver reliable and low-cost electricity to the project sites (August 2013–September 2013).</p> <p>2.3. Establish accountability among the local community, the promoters, contractors, and suppliers for the operation and maintenance of the plants (September 2013–March 2014).</p> <p>2.4. Conduct an investment forum to present the projects to the financial community (February 2014).</p> <p>2.5. Facilitate the financial closure of at least three small IPP projects (September 2013–March 2014).</p> <p>2.6. Facilitate bidding and procurement of the projects to renewable energy subcontractors and suppliers that are able to construct the plants up to specification at the lowest cost (March 2014–September 2014).</p> <p><b>3. Implementation of government's ongoing and planned energy access programs strengthened</b></p> <p>3.1. Based on resource surveys conducted in activity 1, select renewable energy technology, hardware specification, procurement plan, and implementation plan (January 2013–June 2013).</p> <p>3.2. Evaluate availability and capacity of local renewable energy technology vendors and after-sales service providers, and access to finance and financing schemes (June 2013–September 2013).</p> <p>3.3. Develop feasibility analysis of renewable energy options for providing reliable energy access at community scale and in public facilities (June 2013–March 2014).</p> <p>3.4. Assess manpower resources and capability of MEMR and local government agencies to facilitate coordination between agencies and the private sector (January 2013–March 2013).</p> <p>3.5. Introduce the renewable technologies and delivery models that are going to be implemented on the project sites through seminars and workshops to the local community and government (January 2013–June 2013).</p> <p>3.6. Establish the fiscal incentives and regulatory environment for private sector involvement in the implementation of renewable energy projects (January 2013–December 2014).</p>	Consultants	<b>891.00</b>
	a. Remuneration and per diem	791.00
	- International consultants (18 person-months) - National consultants (113 person-months)	
	b. International and local travel	90.00
	c. Reports and communications	10.00
	Transportation	<b>24.00</b>
	Equipment	<b>5.00</b>
	Training, seminars and survey	<b>25.00</b>
	Representative for contract negotiations	<b>5.00</b>
	Contingencies	<b>50.00</b>

BAPPENAS = Badan Perencanaan dan Pembangunan Nasional (National Development Planning Agency), IPP = independent power producer, MEMR = Ministry of Energy and Mineral Resources, MW = megawatt, NTT = Nusa Tenggara Timur, PLN = Perusahaan Listrik Negara (State Electricity Company).

<sup>a</sup> The computation assumes that households in remote rural areas consume an average of 100 kilowatt-hours per annum. A plant capacity factor of 50% is used for the renewable energy systems.

Source: Asian Development Bank.

## COST ESTIMATES AND FINANCING PLAN

(\$'000)

Item	Amount
<b>Multi-Donor Clean Energy Fund under the Clean Energy Financing Partnership Facility<sup>a</sup></b>	
1. Consultants	
a. Remuneration and per diem	
i. International consultants (18 person-months) <sup>b</sup>	376.00
ii. National consultants (113 person-months)	415.00
b. International and local travel	90.00
c. Reports and communications	10.00
2. Transportation <sup>c</sup>	24.00
3. Equipment <sup>d</sup>	5.00
4. Training and seminars and survey <sup>e</sup>	25.00
5. Representative for contract negotiations	5.00
6. Contingencies	50.00
<b>Total</b>	<b>1,000.00</b>

Note: The technical assistance (TA) is estimated to cost \$1,100,000 of which contributions from the Multi-Donor Clean Energy Fund under the Clean Energy Financing Partnership Facility are presented in the table above. The government will provide counterpart support in the form of counterpart staff, office space, office supplies and data. The value of government contribution is estimated to be \$100,000.

<sup>a</sup> Contributors: the governments of Australia, Norway, Spain, and Switzerland. Administered by the Asian Development Bank.

<sup>b</sup> Includes resource person who would provide specialized consulting expertise and advice to the Asian Development Bank (ADB) project officer.

<sup>c</sup> One vehicle for 24 months at about \$1,000 per month (including fuel).

<sup>d</sup> Includes computers and printers, which will be handed over to the executing agency upon TA completion.

<sup>e</sup> Three pilot surveys on renewable energy resources (e.g., wind assessment) and demand-side aspects (e.g., willingness to pay for energy). These surveys will be conducted by the TA consultant. The scope and budget of each survey will be approved by the ADB project officer prior to initiating the survey.

Source: Asian Development Bank estimates.

## OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

### A. Scope of the Project

1. A team of consultants will work with the Ministry of Energy and Mineral Resources (MEMR), Directorate General of New and Renewable Energy, the regional government of Nusa Tenggara Timur (NTT), and four district governments of Sumba island, over a 2-year period to scale up renewable energy access programs in Sumba. The technical assistance (TA) is administered by the Asian Development Bank (ADB). MEMR is the executing agency and the provincial government of NTT is the implementing agency. The Humanist Institute for Development Cooperation (Hivos), a nongovernment organization of the Netherlands, is a development partner and will align its activities in Sumba to complement the TA.

### B. Terms of Reference

2. The TA will require 131 person-months of consulting services: 18 person-months of international consultants, and 113 person-months of national consultants.<sup>1</sup> The consultants will be hired through a consulting firm on quality- and cost-based selection criteria (90:10) on the basis of a full technical proposal. Services may be provided intermittently, based on agreement between the consultants and ADB. Disbursements will be done in accordance with ADB's *Technical Assistance Disbursement Handbook* (2010, as amended from time to time). Equipment will be procured following ADB's Procurement Guidelines (2010, as amended from time to time) and will be turned over to the executing agency upon TA completion.

3. Overall, the consultants should have extensive experience and knowledge in (i) energy planning; (ii) institutional, financial, and commercial and social (including gender dimensions) aspects pertaining to small-scale renewable energy development in rural and remote areas; (iii) renewable energy development in Indonesia; and (iv) ADB operations including its policies, guidelines, and operational frameworks. The consultants will be expected to have extensive consultations with government representatives at central and local levels, development partners, civil society, nongovernment organizations, and communities. The consultants are expected to devote at least 70% of their time in the field and are expected to set up and manage a project office in Southwest Sumba district, NTT. The consultants will initiate their work by reviewing the background surveys and other information on Sumba that has been developed under financing from Hivos, and which Hivos has agreed to make available to ADB and its consultants, to help inform the TA work plan. ADB will make this data available to the selected consultants upon contract signing.

4. The terms of reference for the consultants include but are not limited to the following:

5. **Renewable energy specialist—team leader** (international, 6 person-months). The team leader will be responsible for (i) overall supervision of the consulting team; (ii) timely and successful implementation of the TA, including managing the overall quality of the deliverables and outputs; and (iii) coordination with MEMR, local governments, and other counterparts including civil society and nongovernment organizations. The team leader should have

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<sup>1</sup> Additional TA resources may become available after inception, which would allow expansion of the scope of the consultant's contract to carry out additional surveys and investigations on the introduction of other renewable energy technologies. Should these resources become available, the contract awarded under the current terms of reference may be revised during implementation to include follow-on surveys, investigations, and consideration of additional renewable energy alternatives.

demonstrated expertise in energy planning and a deep knowledge of small-scale renewable energy systems deployment in various countries, including preferably in Indonesia.

6. **Distribution engineer** (international, 2 person-months). The engineer will be responsible for (i) reviewing the plans of the State Electricity Company (PLN) and the local government for low- and medium-voltage grid extension and rehabilitation work, keeping in mind planned capacity expansion by PLN, the small independent power producers (IPPs), and the local government for mini-grids; (ii) developing project implementation guidelines and recommendations, including scheduling, contract packaging, and procurement based on competitive bidding procedures; and (iii) providing inputs to the investment plans being developed by the small IPPs, or the local government, for mini-grid and community-scale systems, under the TA.

7. **Micro hydro specialist** (international, 2 person-months). The specialist will (i) review hydrological studies conducted by the small IPPs, conduct due diligence on resource availability, and identify a priority list of locations; (ii) review investment plans and engineering cost estimates, and support due diligence on all micro hydro projects being considered for development in the TA; (iii) where needed, the specialist will work with the national specialist to upgrade hydrological analysis and fill in gaps; and (iv) develop project implementation guidelines and recommendations, including scheduling, contract packaging, and procurement based on competitive bidding procedures.

8. **Small wind energy systems specialist** (international, 2 person-months). The specialist will (i) review wind resource surveys that are available, conduct due diligence on resource availability, and identify a priority list of locations; (ii) review investment plans and engineering cost estimates, and support due diligence on all small wind projects being considered for development in the TA; (iii) work with the national specialist to upgrade resource analysis and fill in gaps, where needed; and (iv) develop project implementation guidelines and recommendations, including scheduling, contract packaging, and procurement based on competitive bidding procedures.

9. **Renewable energy finance specialist** (international, 2 person-months). The specialist will be responsible for (i) conducting financial feasibility analysis (including cash flow analysis, financial internal rate of return calculations, and due diligence on the project proponents) for renewable energy generation and distribution systems; (ii) liaise with local and national banks, government agencies, and IPPs to evaluate the prospects for launching renewable energy finance programs in collaboration with these agencies; (iii) based on these surveys, propose suitable financing initiatives that can be deployed; (iv) work with select IPPs to conduct financial due diligence and develop bankable projects; and (v) in collaboration with the rest of the team, design and conduct an investor forum in Jakarta or Bali to showcase the priority projects to commercial banks, energy funds, and other potential investors.

10. **Capacity development specialist** (international, 2 person-months). The specialist, in collaboration with the technical experts on the team, will develop capacity development training programs for MEMR and representatives of local governments and agencies covering technical and institutional management in the areas of procurement, financial management, community development, and environmental and social safeguards. These events will be held periodically in Kupang or in Sumba. The specialist will help design and supervise the overall capacity development program, and work with the national capacity development specialist and institutional strengthening specialist who will be in charge of implementation.

11. **Procurement specialist** (international, 2 person-months). The specialist will work with the team leader and deputy team leader to develop suitable contract packaging and procurement plans for the proposed investment projects, in line with the requirements of the small IPPs and the local banks, or MEMR and the local government, as appropriate. The procurement specialist will also assist the capacity development specialist in preparing procurement capacity-related training program modules and other requirements as appropriate.

12. **National consultants** (intermittent). The national consultants (intermittent except when specified, 113 person-months) will include (i) a deputy team leader and renewable energy specialist—12 person-months; (ii) small hydro specialist—5 person-months; (iii) small wind energy specialist—5 person-months, (iv) biomass energy systems specialist—5 person-months, (v) renewable energy finance specialist—5 person-months; (vi) energy economist—3 person-months; (vii) capacity development and institutional strengthening specialist—6 person-months; (viii) community development facilitators—48 person-months; and (ix) office manager—24 person-months.

13. The national consultants will work closely with and support the activities of the international consultant counterparts. The community development facilitators will work with the local communities and the project team to (i) facilitate the community's engagement in project planning through group meetings and organized working groups, and (ii) assist in strengthening the community's overall capacity to ensure sustainable development of the rural electrification projects.

### C. Reporting Requirements

14. The consultants will work under the supervision and guidance of the team leader and deputy team leader. The following reports will be produced at key stages of TA implementation:

- (i) An inception report within one calendar month of TA commencement, a midterm report within 12 months of TA commencement, and a draft final report (20th month) and a final report (23rd month) of TA implementation. These reports will provide information on the TA's progress, training workshops, and key achievements. The inception report should include a knowledge and communication plan. The plan should include by output, the knowledge products to be developed; the method of delivery; the target audience (local governments, line agencies, service providers, beneficiaries, etc.); and tentative schedule in line with the activity time line.

15. The consulting team will submit five hard copies of each report and three digital copies on CD-ROM to ADB and the executing agency.

16. The consultant will administer the training, seminars, and surveys that are envisioned under the TA.