



EnDev Indonesia Annual Report 2013

January 2014



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EnDev Indonesia
Annual Report 2013

January 2014

Foreword

The past year has been a remarkable year for Energising Development Indonesia (EnDev ID). Many occasions and turns of events have shaped the project to be more mature and experienced in delivering EnDev's missions. It was also the year of pursuance to expanding the project scope to also support solar power programme initiated by the government of Indonesia.



The statistics and photos we presented in this annual report will lead you to our journey throughout the year. We would not be able to achieve this success without the dedicated team, trust and cooperation from our counterparts and partners.

Dr. Rudolf Rauch

Director of GIZ Renewable Energy Programme
Indonesia/ASEAN

This Annual Review Report provides a brief overview of achievements for the review year and further information can be obtained from EnDev ID.

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Abbreviation

DGNREEC	Directorate General for New and Renewable Energy and Energy Conservation (Direktorat Jenderal Energi Baru dan Terbarukan dan Konservasi Energi)
DREID	Database Renewable Energy Indonesia
ELC	Electronic Load Control
EnDev ID	Energising Development Indonesia
GIZ	Gesellschaft für Internationale Zusammenarbeit
Green PNPM	Green component of PNPM (pilot project for green technologies)
KPI	Key Performance Indicator
KUKM	Kementerian Koperasi dan Usaha Kecil dan Menengah (Ministry of Cooperative and Small and Medium Enterprises)
kWh	Kilo Watt hour
MEMR	Ministry of Energy and Mineral Resources
MOHA	Ministry of Home Affair
MHP	Mini/micro Hydro Power
MHPP ²	Mini Hydro Power Project for Capacity Development
MHP TSU	Mini Hydro Power Technical Support Unit
MoU	Memorandum of Understanding
NGO	Non-Governmental Organisation
PLN	Perusahaan Listrik Negara (the Indonesian national electricity utility)
PMD	Pemberdayaan Masyarakat dan Desa (Directorate General for Community and Village Empowerment)
PNPM	Program Nasional Pemberdayaan Masyarakat (National Programme for Community Empowerment)
Rural PNPM	Rural component of PNPM
PUE	Productive Use of Energy
PVVP	Photovoltaic Village Power (solar mini-grids)
SBS	Solar Business System
SMS	Short Messaging Service
STT-PLN	Sekolah Tinggi Teknik PLN
TUEWAS	Transport, Environment, Energy and Water in Asia
PSE-UGM	Pusat Studi Energi (Centre for Energy Studies) Universitas Gajah Mada
VMT	Village Management Team



*Energising Development
is an international energy
partnership to promote
sustainable access to
modern energy services
in developing countries.*

Lhoong, Nangroe Aceh Darussalam

Introduction

EnDev Indonesia (EnDev ID) was launched in 2006, along with 20 other participating countries, with a clear objective to quantifiably increase access to modern energy services. Now in its second phase, EnDev ID will conclude mid-2014, which made the year 2013 a defining year for the project. Many of its activities reached their fullest potential, as the EnDev ID consistently contributed to enhancing quality and sustainability in several Indonesian rural off-grid electrification projects, using renewable energy technologies.

Since 2012, the project presents itself collectively as “EnDev Indonesia” in order to foster identity recognition amongst the various public and private stakeholders.

In its second phase, the project comprised two project components: 1) Mini Hydro Power Project for Capacity Development (**MHPP**², project number: 08.2139.7-202.00) as a capacity development component to institutionalize know-how and learning from experiences for a sustainable MHP sector development in Indonesia,

and 2) Green PNPM Micro Hydro Power Technical Support Unit (**MHP-TSU**, project number: 08.2139.7-202.01) to directly support the access to energy through MHP in rural areas. Since 2012 however, the project presents itself collectively as “EnDev Indonesia” in order to foster identity recognition amongst the various public and private stakeholders.

EnDev ID’s primary objective is to support access to electricity to 112,000 people, 200 social institutions, and 340 productive-use-of-energy (PUE) applications in Indonesia.

In pursuance of the indicators, EnDev ID subscribes to two core philosophies:

- To support public or private rural electrification initiatives in Indonesia that will lead to sustainable access to electricity for rural communities, by complementing and strengthening these initiatives, thus avoiding establishing own parallel and competing initiatives.
- To remain flexible and open in terms of rural electrification technologies and adopt a holistic support approach that balances technical, social, economic and environmental aspects.

EnDev ID has ultimate goals of supporting the modern access of electricity for 112,000 people, 200 social institutions, and 340 productive-use-of-energy (PUE) applications

EnDev ID Activities

EnDev ID clusters its activities into six categories, of which three are directly related to infrastructure support, while remaining three focus on long-term sustainability:

MHP Support	<ul style="list-style-type: none">• Micro-hydro power related off-grid projects including technical support to Green PNPM programme, Rural PNPM and others
Solar Support	<ul style="list-style-type: none">• Solar PV related off-grid projects including technical support to DGNREEC solar mini-grid programme and others
PUE Support	<ul style="list-style-type: none">• Productive-use-of-energy support at MHP and solar sites through sensitisation and facilitating access to electrical appliances
Capacity Development	<ul style="list-style-type: none">• Support across all activities to enhance skills in identified target groups
Sustainability Monitoring	<ul style="list-style-type: none">• Support across all activities to put monitoring and evaluation systems in place for quality assurance and early warning toward sustainability of the installed systems
Knowledge Management	<ul style="list-style-type: none">• Support across all activities to capture and disseminate lessons learnt, compile information materials and support public relations and networking activities.



Basic electrical appliances, like this low-cost egg incubator, can substantially improve rural income -

EnDev ID's PUE Pilot Project 2013

2013

in numbers*

* Total achieved to date (since 2009)
** EnDev International reduction factors not considered



Reached **121,187 people****



Connected **983 social institutions** like schools, health centres, community centres

297 mini-grids

Allowed more than **1,336 rural businesses** to grow through energy

Improved area lighting with over **10,000 streetlights**



Processed **495 SMS** received through BREIDGE from community members



Conducted **231 KPI** site surveys



Provided **282 trainings** on various aspects

Database contains **358 sites** (MHP and PVVP) to date



Produced **64 reports, guidelines, posters, videos, planning templates** and other knowledge materials to date



Formalised agreements with **6 institutions**, both public and private, for joint activities

Indicators Achievement

To date EnDev ID supported a total of **297** MHP (micro hydro power) and PVVP (solar PV village power) sites, commissioned by end 2013 under various programmes and initiatives.

Cumulatively, by the end of 2013 EnDev ID has reached **81%** of target “people reached” (as per EnDev International reduction factors). Meanwhile, for social institutions and PUE applications, it has successfully over achieved the target of about **492%** and **668%** respectively.

Figure 1 Number of people reached by the end of 2013 presents the number of people reached by the off-grid electricity facilities supported by EnDev ID. This number is accumulated from **185** MHP sites and **112** PVVP sites all over Indonesia. The MHPs sites consisted of **122** sites under Green PNPM, **54** sites under Rural PNPM, and **9** sites from other initiatives i.e. PUE pilot project and ELC installation.



The annual ASEAN Energy Awards recognise achievements in the generation, supply, management and efficient use of energy within its 10 member states. In 2013 EnDev Indonesia was awarded first prize in the category “Community-based Off-grid”, with its project on micro-hydro power in Lembah Derita, Sumatra Barat. For the first time since 2004, Indonesia’s efforts in rural electrification and renewable energy brought home a first prize.

Figure 1 Number of people reached by the end of 2013 makes distinctions in determining the number of people reached*:

“**Expected people**” reflects the number of people as per pre-construction planning data. This number is often higher than actual people connected upon commissioning of the off-grid facility.

“**EnDev Counting**” reflects the number of people reached after the reduction of various factors. These include sustainability factor, windfall factor and pre-electrification factor. These factors are prescribed by the EnDev International as means to ensure that electricity access.

“**Surveyed**” reflects the actual number of people connected to the off-grid facility, via a distribution mini-grid, recorded during post-construction site surveys. For this EnDev ID uses its KPI methodology.

* For most EnDev ID-supported sites a key performance indicator (KPI) survey is conducted, which provides baseline data for the site. This baseline data is captured in a database and available for subsequent follow-up surveys.

EnDev ID does not count the actual number of individuals in a beneficiary village. This will be logistically excessively complicated. Instead the project records the number of households in the village and assumes an average household size of 4.3 people as per national statistics.

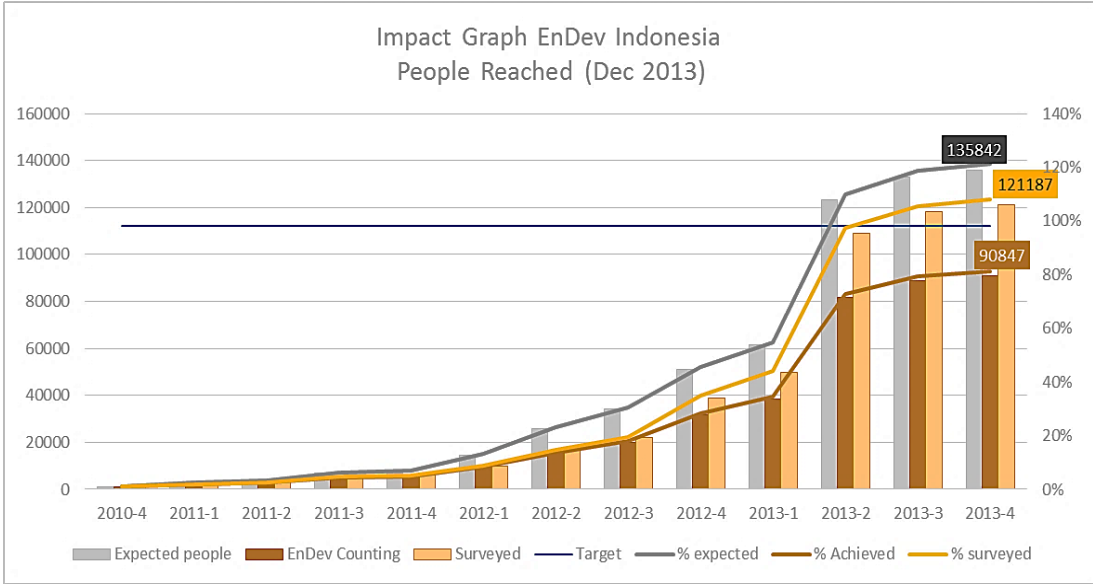


Figure 1 Number of people reached by the end of 2013

Figure 2 Number of SI and PUE supported by the project shows EnDev ID's targets achieved in terms of electricity access social institutions (**983** social institutions to date) and rural businesses (**1,336** rural businesses [also known as PUE applications] to date).

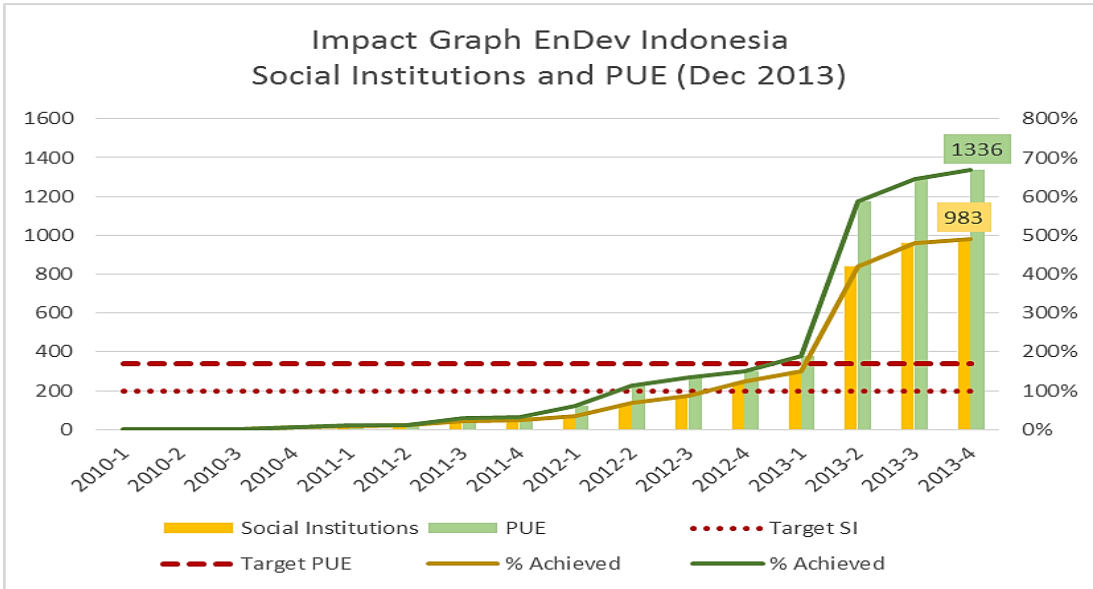


Figure 2 Number of SI and PUE supported by the project



A solar power facility (PLTS) 15 kW among 117 systems constructed by DGNREEC in 2012, for which EnDev ID undertook technical review and community development in 2013.

MHP Support

PNPM

EnDev ID concluded its support to Green PNPM, coordinated by the Ministry of Home Affairs (MOHA), with a total of **136** MHP sites where **122** of them were commissioned by end 2013 in Sulawesi and Sumatra. While Green PNPM itself, as a pilot project under Rural PNPM, ended in December 2012, EnDev ID continued its support until November 2013, in order to assist some final remaining MHP sites.



Penstock installation as part of civil works

Green PNPM support was conducted under the MHP-TSU component and in November 2013 this component was officially closed and assets handed-over to Directorate General for Community and Village Empowerment (PMD) under MoHA.

EnDev ID expanded its support to MHPs outside Green PNPM by mid-2013, particularly to the MoHA's Rural PNPM programme. An initial pilot initiative was conducted with on-site technical inspection and

VMT training at **54** MHP sites in Sulawesi. EnDev's support for Green PNPM officially closed in December 2013, but Rural PNPM support will likely significantly increase.

ICED

In March 2013, the USAID-funded Indonesia Clean Energy Development Project (ICED) launched a call for small grants proposals. EnDev ID, in collaboration with Indonesia Environmental Consultants (IEC) and a Sumatra-based NGO ProWater, submitted a project proposal for the funding of 2 MHP sites in Pasaman Barat, Sumatra Barat, which was approved. Site commissioning is scheduled for early 2014. This initiative follows EnDev ID's general approach of leveraging national funding sources towards achieving rural electrification targets, and maximising local involvement as means to pursue sustainability.

KUKM

In pursuance of encouraging business development at MHP sites, EnDev ID established cooperation with the Ministry of Cooperative, Small and Medium Enterprises (KUKM). A Memorandum of Understanding, between GIZ and KUKM, was signed in November 2013 and 10 MHP sites will be commissioned by early 2014.

KUKM programme has a rather different approach compared to other government funded off-grid rural electrification programmes. In this initiative, the Ministry provided the grant directly to the selected cooperatives. This addresses two past concerns regarding MHP sustainability: a dedicated owner, reaping direct benefits, is now in place; and MHP investment is now in the hands of a full legal entity.

The KUKM programme's most prominent objective is to empower the cooperatives in sub-district level to be able to operate and manage an MHP which was designed to run a rural business in the village. For this purpose, EnDev ID will also support in business development capacity building for the cooperatives.



A sluice gate and channel diverting water to the MHP powerhouse

EnDev ID has contributed towards MHP approaches and policies in Indonesia by:

- Designing and refining commissioning procedures for MHP installations in order to improve technical implementation and performance of MHP infrastructure
- Publish "Best Practice Guidelines for Rural Electrification" in Bahasa Indonesia
- Advising through consultation sessions on how Green PNPM lessons can be incorporated into Rural PNPM, resulting in an institutional strengthening initiative within Rural PNPM for 2014.

Solar Support

PVVP

EnDev ID provided extensive support to DGNREEC's PVVP 2013 programme for **112** solar mini-grids (photovoltaic village power, PVVP) installed across Indonesia. The objective was to assess component compliance, performance verification and workmanship quality of the installations.

EnDev ID contracted international expertise to undertake the technical inspections, as well as train VMTs, collect baseline data and establish a PVVP quality assurance system. During the review a total of over 40,000 photographs and almost 3,000 survey sheets were evaluated in depth, according to a standardised evaluation methodology, and the summarised findings and recommendations for each site submitted to DGNREEC. A ***Final Executive Report on Technical Review of PVVP (GIZ 2013)*** was provided to DGNREEC in October.



A typical PVVP installation comprises a solar PV array, a power house for batteries and electronic equipment and a low voltage distribution grid with streetlights and household connections.

EnDev ID compiled an ***Inspection Guide for Solar Mini-Grids (GIZ 2013)*** to describe in detail the inspection process and checklists and survey sheets used. This is an available resource aimed at facilitating a swift, yet holistic, assessment of the technical quality of a complete solar photovoltaic mini-grid.

A PVVP operator is cleaning the solar panels as part of daily maintenance.





Installing the SBS at a fish farm house in Waduk Cirata, Jawa Barat

SBS

EnDev ID concluded a pilot project on the Solar Business System (SBS) concept, in collaboration with Sekolah Tinggi Teknik (STT) PLN in March, through which the viability of a micro enterprise approach towards increasing rural energy services can be assessed. The SBS is a locally assembled small-scale solar PV-based plug-and-play system developed for use in warungs to provide basic charging services for rechargeable electric lanterns and other appliances.

This pilot project comprised the technical performance testing of the SBS prototype in the field, combined with financial performance to evaluate the business potential. While the technical performance was positive, the economic performance remained inconclusive.

EnDev ID has contributed towards PVVP approaches and policies by:

- Conduct, evaluate and submit detailed technical inspections on PVVP infrastructure to DGNREEC for follow-up with contractors. Technical evaluations were submitted by DGNREEC to respective contractors for corrective measures.
- Designing technical inspection checklists and guidelines for PVVP infrastructure to enhance the quality of installations by contractors. Checklists were included by DGNREEC into contract documents for PVVP installations to be commissioned in 2014.



Of the 117 PVVP installations scheduled for inspection from April to July 2013, 5 sites could not be inspected. This was due to cumbersome logistical requirements. EnDev ID's PVVP inspectors had first-hand experience on how difficult it is to reach many sites.

The inspectors frequently marvelled at how solar contractors were able to transport over one hundred solar PV panels, up to 100 batteries (each weighing almost 100 kg) and a large quantity of electric cables, steel poles and other construction materials, to site.

Indeed the logistical effort in constructing most PVVP sites was substantial, and the achievement of the Indonesian solar contractors should be complimented.



PUE Support

PUE Pilot

Besides the aforementioned programmes, EnDev ID supported 5 additional MHPs both in Sumatra and Sulawesi under PUE pilot project. These MHPs were built either by communities or under previous phase of Rural PNPM.

EnDev ID conducted the pilot project together with two NGOs (ProWater and Operation Wallacea Trust) at 9 MHP communities, involving 53 rural businesses.



Working on a clothing item using manual sewing machines may take around 3 weeks. Through an electric sewing machine, the production time reduced to only 3 days. However, for some artwork, the villagers still prefer to use the manual appliance.

The pilot allowed EnDev ID to identify a number of promising rural businesses that can have high positive impacts on the MHP's sustainability and on the village's growth opportunities. The majority of businesses reported an increased profitability, with mechanical workshop, carpentry and tailor being the most popular businesses in villages. Other than that, there is also big potential for agro-processing (rice and coffee), blacksmith and food processing.

EnDev ID concluded the pilot project with publishing its report entitled ***Productive Use of Energy - Findings of Pilot Project (GIZ 2013)***.

Motorbike repairs could be performed closer to the market, creating both a viable business and reducing inconvenience and expense for clients. A normal motorbike ride from Masamba to Seko (Sulawesi Barat) may take 4 days. By modifying the motorbike (suspension, tune-up, etc.), the distance can be covered in only 2 days. The workshop also manufactured and installed attractive enhancements to turn a motorbike into a prestige item.



Capacity Building

EnDev ID capacity building efforts primarily focus on the Village Management Team (VMT) responsible for operation, management and administration of the MHP or PVVP infrastructure and electricity distribution mini-grid. By end 2013, a total of **146** VMT trainings were conducted, of which **24** were group trainings (5-day training comprising several beneficiary VMTs at a central venue) and **112** were individual trainings (1.5-day training on site). The total number of participants at our VMT trainings to date exceeds 630 people.

EnDev ID also provided several specialised targeted training in 2013, collectively attracting over 200 participants to date:

- 3-day training of PVVP inspectors on technical review of PVVPs (18 participants)
- 1-day training of PUE aspects for ASEAN-wide MHP practitioners (25 participants)
- 1 week training on MHP technical aspects for GIZ Hydro Power Network, with site visits to Sumatra (18 participants)
- 10-day training for local turbine manufacturers (27 participants)
- 4-day training for VMT Trainers (15 participants)
- 5-day training for PNPM Technical Facilitators (96 participants)
- 2-day training on MHP technical commissioning (18 participants)

Comprehensive VMT training materials have been compiled and form part of EnDev ID's greater knowledge management strategy.



Troubleshooting posters for MHP and PVVP, used during VMT training, are really critical for operator of VMT to overcome technical problems.

Sustainability Monitoring

To ensure that people are reliably supplied from the installed power generator, monitoring mechanisms are vital. Only through monitoring and evaluation, are improvements possible. EnDev ID's sustainability monitoring strategy encompasses:

- Detailed baseline data of sites,
- Manual and automatic means to record and acquiring data from site,
- Communication platform to provide support to communities regarding MHP and PVVP operation and management, and
- User-friendly system for data entry, storage and analysis.

EnDev ID's efforts in sustainability monitoring comprise different tools:

Title	Description	Records available to date
BReIDGE	SMS-based digital communication channel between rural beneficiaries (MHP and PVVP operators) and EnDev ID for the purpose of a) supporting beneficiaries with operational questions and technical troubleshooting and b) collect periodic data from operators, such as energy consumption. This service was launched in March 2013 and has been refined significantly in anticipation to handing the system over to a suitable agency in 2014. In January 2014, the system commenced to be available online for limited users.	495 SMS received and processed
DREID	Consolidated database of records collected under Green PNPM, KPI surveys, BReIDGE and other. Database is in a SQL platform with user-friendly interface for "search-ability". The database is still undergoing refinement and data migration.	358 sites and over 200,000 records
KPI	Key Performance Indicator survey methodology, comprising standard 8-page questionnaire, user manual and data entry tool. KPI data comprises technical, social, economic and environmental sections and the questionnaires are customised for MHP and PVVP sites.	231 KPI surveys conducted
KWh-meter	In order to determine MHP performance, basic energy generation/consumption records are essential. Numerous MHP sites under Green PNPM were not installed with kWh-meters to facilitate future analyses. EnDev ID concluded an installation of 51 kWh-meter sets at MHP sites.	51 kWh-meters installed at MHP sites
ELC installation	Electronic Load Controller (ELC) is an essential electrical component that can manage load for power plant which prevents the system from damaging appliances. It is a vital component to improve system sustainability.	2 ELC installed at MHP sites

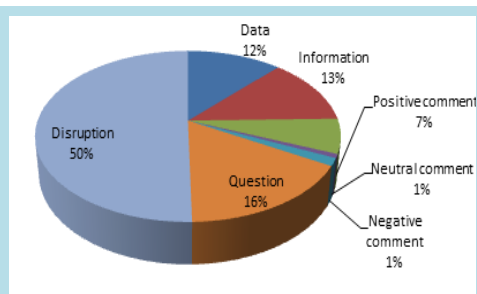
BReIDGE

The SMS communication platform,

BReIDGE, was initiated early 2013 as a pilot project. The increasing utilisation of BReIDGE by rural communities to seek technical advice and guidance, as well as attractiveness of the system to acquire data from sites has led to a decision end 2013, to fully operationalise BReIDGE. BReIDGE will be one of EnDev ID's flagship initiatives in 2014 and negotiations with Centre for Energy Studies Gajah Mada University (PSE-UGM) are underway to host the system.

KPI EnDev ID supported sites should contribute towards achieving EnDev ID's primary objective of increasing access to electricity. Whether this objective is being met requires substantiated and accurate data collection and analysis. For this EnDev ID has established a Key Performance Indicator (KPI) survey methodology. The KPI surveys, as a minimum, serve to provide baseline data. Follow-up KPI surveys can then be compared with reliable data.

ComStu Mid-2013 EnDev ID conducted a comparative study between different MHP facilities, using its KPI methodology. The study aimed to answer the research question: "Does the EnDev ID concept improve the sustainability of the MHPs compared to other off-grid MHP schemes in Sulawesi?". A total of 32 MHP sites were surveyed over several weeks and the results published in *EnDev2 Impact on Sustainability - A Comparative Study (GIZ 2013)*.



SMS from communities, received through BReIDGE, offer an opportunity for deeper data analysis. EnDev ID has responded to all SMS received and in many cases a multi-SMS exchange resulted, as EnDev ID guided a VMT into identifying and addressing problems they faced.

This is the deeper value of BReIDGE: remotely and interactively lending assistance to rural communities who manage their own electricity supply infrastructure.



"You cannot improve if you do not monitor". With this principle in mind, EnDev ID maintains an extensive database of all rural electrification sites it supports. This involves allocating a unique identification number to each site. This number is also spray painted to the power house. To date EnDev ID's database includes **358** sites.

It is of vital importance to familiarise the local operator with operating a power generation plant.



Knowledge Management

Recording, compiling and disseminating knowledge gained during implementing its various activities, remains one of EnDev ID's core responsibilities. Apart from obligatory progress or status reports, EnDev ID seeks to provide user-friendly pragmatic information to different stakeholders using various formats and means of distribution:

- Conventional technical manuals on maintenance and troubleshooting of MHP or PVVP systems have been adapted into weather resistant A0 poster that are displayed in powerhouses or community centres in villages. The posters are also used as basis for on-site training, and thus also serve as an aid to recall training information. The poster series currently includes:
 - Troubleshooting Guide for MHP (GIZ 2012)
 - Troubleshooting Guide for PVVP (GIZ 2013)
 - Guidelines for Village Management Teams (GIZ 2013)
 - Catchment Area Protection for MHP Systems (GIZ 2013)
- EnDev ID concludes most of its activities with a concise report which aims to reflect accurately and objectively what knowledge and insights have been gained. This is to ensure that lessons are not lost and that informed decision-making can guide future actions. Many of these publications also include spreadsheet tools and templates to facilitate efficient replication of activities. Added to the list of publications in 2013 are:
 - EnDev ID Indonesia: Impact on Sustainability (GIZ 2013)
 - Inspection Guide for Solar Mini-Grids (GIZ 2013)
 - Productive Use of Energy - Findings of Pilot Project (GIZ 2013)



- EnDev ID organises its knowledge materials in regularly updated versions of the **multi-media DVD: “All About MHP” (Version 3, GIZ 2013)**. This bi-lingual DVD not only includes numerous past and current reports, but also power point presentations and videos on various aspects of MHP, PVVP and other topics related to rural development. All video work, from compiling scripts and capturing footage to recording narrations and producing final products is done in-house by EnDev ID.

EnDev ID’s philosophies on Knowledge Management are to ...



... appreciate solid facts.



... support peoples’ practical needs.



... contribute towards the big picture.



... realise that learning is a team effort.



... collectively ensure quality.



... know that wisdom is knowledge applied.

Outlook for 2014

EnDev ID will maintain its services and commitments to Indonesia's rural electrification ambitions in 2014 and will deepen its collaboration with its key partners. EnDev ID's technical support has evolved to provide final commissioning and technical inspection services to many more sites, rather than complete engineering services to limited sites, due to increased local capacities in Indonesia.

For **DGNREEC**, EnDev ID will conduct technical inspections of over 100 new PVVP and 12 MHP installations, combined with training DGNREEC inspectors and providing inputs to incorporate well-defined quality criteria in tendering and commissioning processes. VMT training and KPI surveying will be an integral part.

Despite the formal closure of Green PNPM and MHP-TSU, EnDev ID continues close collaboration with **PMD** for Rural PNPM. EnDev ID will conduct extensive training of Rural PNPM field facilitators in technical inspection and VMT training. This capacity building measure is firmly integrated with the technical inspection of over 80 new MHPs in Sulawesi Selatan, requested by the Provincial Government.

With the signing of the MoU between **KUKM** and GIZ, EnDev ID will train 10 cooperatives in MHP operation and management, as well as productive use of energy and business development. This collaboration with KUKM is of key interest to EnDev since it pursues a viable ownership structure for rural electricity infrastructure.

"EnDev International favourably views instances where national public and/or private agencies in the beneficiary countries financially contribute towards rural energy access.

Where EnDev has identified opportunities to leverage funding from national sources they should be pursued and supported, because a) this demonstrates national ownership of rural energy access programmes, b) synchronises EnDev's objectives and activities with national objectives and activities, c) reduces the EnDev costs per person reached and d) it strengthens and deepens growth of a national energy sector."

- **EnDev International communiqué, November 2013**



Beneficiary support is a key sustainability measure

Annex: List of Knowledge Materials

Guides

Inspection Guide for Solar Mini-Grids (GIZ, 2013)
Multimedia DVD Version 3: All About MHP (GIZ, 2013)
KPI User Manual for PVVP (GIZ, 2013)
KPI User Manual for MHP (GIZ, 2012)
Best Practice Guideline for Rural Electrification_en (GIZ, 2011)
Manual on Productive Use of Energy_en (GIZ, 2011)
Baik & Buruk dari Mini Hidro Vol 1 (ACE, 2009)
Baik & Buruk dari Mini Hidro Vol 2 (ACE, 2009)
Good & Bad of Mini Hydro Power Vol 1 (ACE, 2009)
Good & Bad of Mini Hydro Power Vol 2 (ACE, 2009)
Hydro Scout Guide (GTZ, 2009)
Langkah Pembangunan PLTMH (GTZ, 2005)
Panduan Singkat - Mengenal Lingkungan PLTMH (Entec)
Panduan Spesifikasi Teknis (TSU, PNPM)
Panduan Teknis Konstruksi PLTMH (TSU, PNPM)
Pedoman Praktik Terbaik untuk Listrik Perdesaan (GIZ, 2011)
Pedoman Singkat PLTMH (GIZ, 2011)

Posters

Poster Troubleshooting Guide for MHP Problems (Indonesian and English) (GIZ, 2013)
Poster Troubleshooting Guide for PVVP Problems (Indonesian and English) (GIZ, 2013)
Poster Catchment Area Management for MHPs (Indonesian and English) (GIZ, 2013)
Poster Guidelines for Village Management Teams (Indonesian and English) (GIZ, 2013)

Reports

Final Executive Report on Technical Review of PVVP (GIZ, 2013)
EnDev2 Impact on Sustainability - A Comparative Study (GIZ, 2013).
Productive Use of Energy - Findings of Pilot Project (GIZ, 2013)
EnDev Indonesia - Productive Use of Energy - Findings of Pilot Project (GIZ, 2013)
Survey on Key Performance Indicators for Indonesian Micro-hydro Power Sites (GIZ, 2012)
Benefit & Cost Study: Retrofitting the Standalone MHP into Grid-connected System (GIZ, 2012)
Grid in-feeding screening tool user manual (GIZ, 2012)

EnDev ID uses various platforms to disseminate information, such as:

Website (<http://endev-indonesia.or.id>)

Energypedia (<https://energypedia.info>)

GIZ media centre (<http://www.giz.de/en/mediacenter/publications.html>)

Facebook (<http://www.facebook.com/pages/GREENergy-Indonesia/451553694886676>)

Twitter (<https://twitter.com/GREENergindo>)

YouTube (<http://www.youtube.com/user/GREENergyIndonesia>)



Indonesia - Sustainable PV Diffusion Alternatives, March 2012
 Indonesia PUE database introductory manual (GIZ, 2012)
 Report: Indonesia - Sustainable PV Diffusion Alternatives (GIZ, 2012)
 Survey Productive Use Potential (GIZ, 2011)

Templates and Tools

PV-VP Technical Checklist templates (Indonesian and English) (GIZ, 2013)
 PV-VP KPI questionnaire (GIZ 2013)
 PV-VP Technical Survey Summary template (Indonesian and English) (GIZ, 2013)
 Spread sheet: Grid in-feeding screening tool (version 2) (GIZ, 2012)
 Template: MHP Commissioning checklist and manual (GIZ, 2012)
 Template: MHP Commissioning report (GIZ, 2012)
 Template: MHP Pre-commissioning checklist and manual (GIZ, 2012)
 Template: PUE Screening form (GIZ, 2012)
 Tool: Treasurer Cash Book for MHP and PV-VP (GIZ, 2012)
 Tool: Operator Log Book for MHP and PV-VP (GIZ, 2012)
 Tool: Customer Book for MHP and PV-VP (GIZ, 2012)
 Tool: Activity Book for MHP and PV-VP (GIZ, 2012)
 Tool: Tariff Card for MHP and PV-VP (GIZ, 2012)

Training Modules

Training Module: Institutional Setup of Village Management Team for PV-VP, April 2013
 Training Module: Institutional Setup of Village Management Team for MHP, December 2012

Videos

No	Full Name	Content	Year	Languages
01.	Catchment Area Management	A natural forest provides many important services to its people. A stable and reliable water flow in rivers is ideal for micro-hydro power generation and it is directly related to the health of the forest.	Jun 2013	Indonesian + English
02.	Global Hydro Workshop 2013	The 5 th GIZ Micro Hydro Power Workshop was held in Indonesia from April 15 -22, with the support of the GIZ Sub-Sahara Sector Network and Energising Development.	Apr 2013	Indonesian + English
03.	Productive Use of Energy	Rural electrification has a purpose. That purpose is the improvement of livelihoods for rural communities on a sustainable basis with maximum positive social, economic and environmental impacts.	Nov 2012	Indonesian + English
04.	Sustainability of Centralized Photovoltaic	Centralised solar powered mini-grids are a viable alternative for many rural villages. Unlike small solar home systems, solar mini-grids can cater for many more appliances and encourage productive use of energy.	Jun 2013	Indonesian + English
05.	Solar Energy to provide electricity	Solar energy maintenance and sustainable operation.	Jun 2013	Indonesian

to the community				
06.	Solar Energy – Solok	Solar energy and the application of the monthly tariff system for sustainability.	Apr 2013	Indonesian
07.	Micro Hydro Power Plant	Electricity is a very efficient energy form for reducing work load, making tasks easier and providing access to education and entertainment.	Jan 2013	English
08.	Administration	Administration is activities related to record-keeping or book-keeping which are an essential part of the MHP management.	Jan 2013	English
09.	Financial Management	Financial management, done by the “accountant” who regulates and controls all MHP financial aspects, including book-keeping and reporting cash flow.	Jan 2013	English
10.	Maintenance	MHP maintenance is important to ensure all components function well, unanticipated breakages are avoided and electricity supply remains stable. Regular maintenance is the key factor towards sustainability.	Jan 2013	English
11.	Electricity Utilisation	Appropriate electricity usage can improve the quality of live in rural communities. They can extend their productive or entertaining activities by using electricity.	Jan 2013	English
12.	Commissioning	Commissioning is the process of thoroughly testing the MHPs functioning. This consists of verifying construction is in line with the design and on the site testing of the equipment.	Jun 2012	Indonesian + English subtitles
13.	Case-MHP Construction in Mesakada	Progress report on construction MHP in Mesakada, April 2010. Construction work of the weir, penstock and powerhouse also planting pine trees work.	Jun 2013	Indonesian + English subtitles
14.	Case-MHP Utilisation in Lisuan Ada	With the right facilities and technology applied for utilization of rural energy sources, it can be expected that small scale industrial and productive activities will emerge providing a stimulus to the local economy.	Jun 2013	Indonesian + English subtitles
15.	Current Meter	Instructions on flow Measurement using current meter method. Current meter is a measuring instrument used to measure water flow in the river.	Feb 2013	Indonesian + English subtitles
16.	Easy-flow	Instruction to flow measurement using conductivity meter easy-flow. Easy-flow is measuring equipment to measure flow river.	Feb 2013	Indonesian + English subtitles
17.	Flow Measurement by Float Method	Flow measurement by float method. This is an indirect method to measure the flow, because it only measures the stream velocity by measuring the time needed for the floater to pass a distance that is set on a river.	Feb 2013	Indonesian + English subtitles

18. Head Measurement by Plastic Tube	Head measurement by tube filled with water method. This method is better used if the other leveling tools are unavailable. Although accurate enough, this method needs more time to study and to design the MHP.	Feb 2013	Indonesian + English subtitles
19. Method of MHP Construction Implementation	Construction method is one stage of work implementation in and MHP construction process. MHP implementation or construction work begins with the preparation of materials, setting the work quality standards, and method of work implementation.	Jan 2013	Indonesian + English subtitles
20. Productive Use of Energy	Other than being used for household purposes; lighting, TV, radio, etc., electricity can also be used for productive business such as welding machine, milling and others.	Feb 2013	Indonesian + English subtitles
21. MHP Operational	Before performing the operation, check first the intake, channel, forebay, penstock, and turbine components, so that the operation can run properly.	Feb 2013	Indonesian + English subtitles
22. MHP Institutional Setup	Energy supply from Micro Hydro Power or MHP may provide a lot of benefits. The community can enjoy better lighting in the evening, get information from television or utilise the energy from MHP for business.	Feb 2013	Indonesian + English subtitles
23. Formulation of Village Regulation and Monitoring System	The community must establish a clear and transparent tariff system, and requires the beneficiaries to follow the system. Sanctions should also be introduced for those who violate it.	Feb 2013	Indonesian + English subtitles
24. MHP Financial Management	Management organisation is formed to ensure that the MHP will work well and also based on a good financial management.	Feb 2013	Indonesian + English subtitles
25. Head Measurement by Pressure Gauge Method	Head measurement by gauge pressure method. Pressure gauge or manometer is a method to measure head or height difference using a water hose mounted in a water pressure gauge.	Feb 2013	Indonesian + English subtitles
26. Socialisation of Institutional Setup	Institutional socialization MHP is one of the activities in the establishment and strengthening of village-level MHP. In the PNPM-LMP, socialization activities carried out during the construction still going on.	Jan 2013	Indonesian + English subtitles
27. Stake Out to Determine Water Surface Elevation	Stakeout is the detailed measurement and placing of markers to be used as a reference during construction. This activity is very important because it determines the elevation of the water level, as a primary reference for civil structures of the MHP plant.	Jun 2012	Indonesian + English subtitles


28. Supervision and Monitoring of MHP Construction	Technical Support Unit (TSU) as a technical team in PNPM-LMP (MHP), conducting supervision and monitoring on the MHP construction process periodically to direct or mentor the community in construction works.	Jan 2013	Indonesian + English subtitles
29. Tendering Process	Tendering is one element of the Green PNPM project implementation procedure. The tender procedure adopts the same mechanism developed and applied under Rural PNPM.	Jan 2013	Indonesian + English subtitles
30. The Role of TSU within Green PNPM	As an integral component of Green PNPM TSU works together with the Directorate General of Rural Community Empowerment, Dept. of Home Affairs as the project executing agency.	Jan 2013	Indonesian + English subtitles
31. Verification and MHP Potential Survey	Verification of a proposal aims to examine and assess the feasibility of an activity proposed by a village to be funded under Green PNPM.	Jan 2013	Indonesian + English subtitles




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 The Renewable Energy Program Indonesia/ASEAN plays a prominent role in enabling local actors to adopt renewable energy solutions for the people's benefits.

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