



# EnDev Indonesia

Annual Report 2014



**Funded by:**



**Political partner:**



Directorate General of New  
Renewable Energy and Energy  
Conservation (DG NREEC)

**Coordinated and implemented by:**



Netherlands Enterprise Agency

# EnDev Indonesia

Annual Report 2014

January 2015



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

In cooperation with:

Directorate General of New Renewable Energy and Energy Conservation (DJEBTKE)  
under Ministry of Energy and Mineral Resources (ESDM)

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Cover photo caption: Community sensitisation at a medium-voltage mini-grid in Kutime Village, Tolikara District, Papua Province, Indonesia

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# Foreword

Indonesia's electrification ratio has increased dramatically over the last years to 80%. However, over 50 million Indonesians still lack electricity access. As part of the government's ambitious target to achieve an electrification ratio of over 90% by 2019, the Directorate General of New Renewable Energy and Energy Conservation (DJEBTKE) plays a prominent role through its programme to increase the electricity access in remote areas, small islands and border areas using micro hydro and solar technologies. In 2014 alone, the Government allocated more than IDR 150 billion for rural energy infrastructure. It is our sincere endeavour to ensure that the fund results in long-term electricity access to Indonesia's rural communities.



Balance and distribution of development within regions in Indonesia presents fundamental challenges. Development acceleration will depend greatly on the infrastructure availability, including electricity. The potential of renewable energy in Indonesia is very large, but its use is not yet optimal. Considering the prospect, infrastructure, technology and capacity scale, the most realistic renewable energy sources to be developed in Indonesia especially for remote areas, small islands and border areas are mycro hydro and solar.

In its support function to the DJEBTKE, EnDev Indonesia (EnDev ID) project is a corner stone to Indonesia's rural electrification efforts. The project is jointly implemented by DJEBTKE and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH with the main purpose to support the provision of sustainable access to electricity for rural communities.

GIZ's support to renewable energy in Indonesia stretches back to the 1990s, with a focus on micro-hydro power technical support and today Indonesia has internationally recognised micro-hydro power expertise. Building on this cooperation, EnDev ID project has expanded its scope to include solar photovoltaic technologies since 2012.

EnDev ID project specifically supports DJEBTKE's rural electrification programme, which constructs over 100 solar and micro-hydro power mini-grids across Indonesia annually. Whereas DJEBTKE sets infrastructure in the field, EnDev ID puts sustainability measures in place, such as technical quality support, skills development for beneficiary communities and data collection and monitoring activities. The project also cooperates with other institutions implementing rural electrification using renewable energy through various cooperation schemes. This practical collaboration with national programmes is of key importance to DJEBTKE's development strategy as the focal point of decentralized rural electrification.

## **Alihuddin Sitompul**

Director for Various New Energy and Renewable Energy  
Directorate General of New Renewable Energy and Energy Conservation (DJEBTKE)  
Ministry of Energy and Mineral Resources (ESDM)  
Republic of Indonesia

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# Abbreviation

ASEAN	Association of Southeast Asian Nations
AMEM	ASEAN Ministers of Energy Meeting
BCD	Business Capacity Development
DJEBTKE	<i>Direktorat Jenderal Energi Baru, Terbarukan dan Konservasi Energi</i> (Directorate General of New Renewable Energy and Energy Conservation)
EnDev ID	Energising Development Indonesia
ESDM	<i>Kementerian Energi dan Sumber Daya Mineral</i> (Ministry of Energy and Mineral Resources)
FGD	Focus Group Discussion (stakeholder workshop)
GIZ	Gesellschaft für Internationale Zusammenarbeit
Green PNPM	PNPM Lingkungan, Green component of PNPM (pilot project for green technologies)
ISRE	Rural PNPM Institutional Strengthening for Renewable Energy
KKP	<i>Kementerian Kelautan dan Perikanan</i> (Ministry of Marine and Fishery)
KPI	Key Performance Indicator
KUKM	<i>Kementerian Koperasi dan Usaha Kecil dan Menengah</i> (Ministry of Cooperative and Small and Medium Enterprises)
MOHA	Ministry of Home Affairs
MHP	Mini/micro Hydro Power
MoU	Memorandum of Understanding
MSP	Mini-grid Service Package
MW	Mega Watt
PNPM	<i>Program Nasional Pemberdayaan Masyarakat</i> (National Programme for Community Empowerment)
RE-Map	Rural Electrification Map
Rural PNPM	PNPM Mandiri Perdesaan, Rural component of PNPM
PUE	Productive Use of Energy/Electricity
PVVP	Photovoltaic Village Power (solar mini-grids) or known as <i>Pembangkit Listrik Tenaga Surya (PLTS) Terpusat</i>
SAM	Support Activities for MHP
SI	Social Institutions
SMS	Short Messaging Service
TOT	Training of Trainers
TSU	Technical Support Unit
VMT	Village Management Team

A photograph of a long wooden pier extending from the foreground into a body of water. On the left, there are several traditional wooden houses built on stilts (stilt houses). One house has a corrugated metal roof and a clothesline with laundry. Another house further down the pier has a satellite dish mounted on its roof. The water is calm with a few small boats visible in the distance under a clear blue sky.

## Energising Development is a global energy partnership

*to promote sustainable access to  
modern energy services in  
developing countries*

# Introduction



Energising Development Partnership (EnDev) is a joint impact-oriented global programme of Germany, the Netherlands, Norway, Australia, United Kingdom and Switzerland, with additional co-funding from Ireland and the European Union. The Energising Development programme, started in 2005, has the objective of facilitating sustainable access to sustainable energy services to 14.3 million people in developing countries by 2018. Currently, EnDev is active in 24 countries in Asia, Latin America and Africa.

EnDev Indonesia (EnDev ID), jointly implemented by DJEBTKE and GIZ, was launched in 2009 and has the objective to support access to electricity to 172000 people, 900 social institutions, and 1000 small-scale rural businesses in Indonesia.

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

- To support DJEBTKE and other public or private rural electrification programmes in Indonesia towards sustainable access to electricity for rural communities, by complementing and strengthening these initiatives.
- To remain flexible and open in terms of rural electrification technologies and adopt a holistic approach that balances technical, social, economic and environmental aspects.

The Energising Development Partnership (<http://endev.info>) is implemented and coordinated by GIZ. EnDev maintains an extensive public information sharing and knowledge exchange platform called <https://energypedia.info>.

*EnDev countries and technologies*



# EnDev ID Activities

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

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



*Management materials and training are provided to the Village Management Team (VMT) responsible for operating their electricity generation infrastructure.*

# EnDev ID activities in numbers up to **2014**

Supported  
**508**  
mini-grids



**231**  
DJEBTKE

**258**  
PNPM

**10**  
KUKM

**9**  
Others

Reached  
**225918**  
People

Connected  
**1114**  
social institutions  
like schools and community centres

Allowed  
**2662**  
rural businesses  
to grow

- All numbers are the total number achieved since 2009
- Reduction and adjustment factors according to EnDev Global counting mechanism are not considered

# Indicators Achievement

By end of December 2014 EnDev ID has supported a total of **508** MHP and PVVP sites, commissioned under various Indonesian programmes and initiatives. Primary partner for EnDev ID is DJEBTKE, but substantial support was also provided to PNPM and KUKM. As such EnDev ID is currently one of the most active rural electrification support initiatives to the Government of Indonesia.

EnDev ID conducts bi-annual monitoring and updating of its primary indicators: people reached, social institutions (SI) connected, and productive use of energy (PUE) connected. These values are reported to DJEBTKE and EnDev Global.

EnDev Global has a unique counting methodology, which adjusts the indicator values reported by EnDev ID in order to conservatively reflect the impact this global programme has in terms of providing people with access to sustainable energy. Therefore there are 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.

**“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.

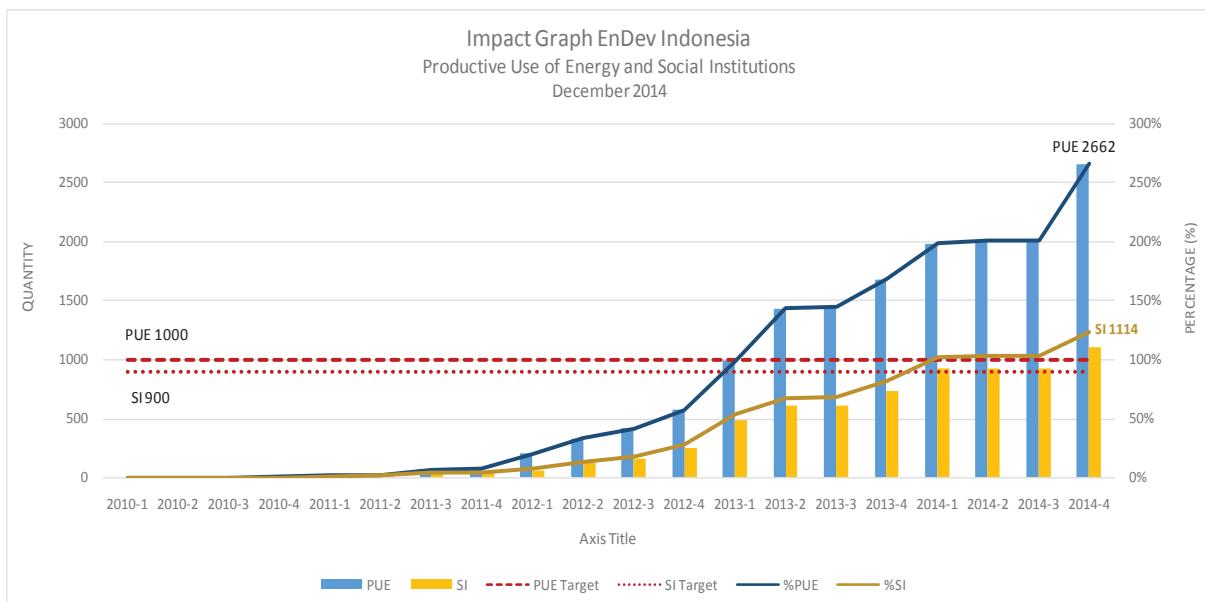
**“Achieved”** reflects the number of people reached after the reduction of various factors. These include sustainability factor, windfall factor and pre-electrification factor. These factors are prescribed by EnDev Global.

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 challenging. Instead the project records the number of households in the village and assumes an average household size of 4.5 people as per available statistics.

EnDev ID, for the reporting period December 2014, has supported **225918 people**, **1114 SI** and **2662 PUE** in receiving access to electricity as well as in operating and maintaining the facilities. These numbers have not considered counting adjustments by EnDev Global.

Of the total number of off-grid sites supported, 49% were implemented under DJEBTKE, nearly 50% under PNPM initiative, and less than 1% each by KUKM and others.



In 2014 EnDev ID was awarded the first prize in the category "Local Grid", during the 32<sup>nd</sup> ASEAN Ministers of Energy Meeting (32<sup>nd</sup> AMEM) in Vientiane, Lao PDR. This award was dedicated to the MHP Tulak Tallu, Luwu Utara District, in Sulawesi Selatan Province. This was the second ASEAN Energy Award in two years. The annual ASEAN Energy Awards recognise achievements in the generation, supply, management and efficient use of energy within its 10 member states.



This solar power mini-grid installation (PLTS) in Maluku Utara

*is among 119 systems constructed by DJEBTKE in 2013, for which EnDev ID undertook technical review and community development in 2014*

# MHP Support

## ISRE

EnDev ID concluded its support to Green PNPM, coordinated by the Ministry of Home Affairs (MOHA), with a total of **122** MHP sites by early 2014 in Sumatra and Sulawesi. While Green PNPM itself ended, the need for EnDev ID support remained. In early 2014 the Provincial Governments of Sulawesi Barat and Sulawesi Selatan requested an official support for **80** MHP sites constructed under Rural PNPM. Thus Rural PNPM Institutional Strengthening for Renewable Energy (ISRE) was launched.

ISRE, supported by Rural PNPM field facilitators implemented a challenging programme of technical inspection and community development, combined with training of trainers' courses, within seven months. ISRE conducted **8** training events for a total of **80** Rural PNPM field facilitators and **246** VMT members. It also built the skill set of a local consultant team, who conducted **82** MHP inspections in the field.



*Training of Village Management Team in Sulawesi Barat Province on off-grid MHP development.*

## SAM

The Support Activities for MHP (SAM) adopted the Mini-Grid Service Package (MSP) which comprises technical inspections, VMT training, baseline survey and introduction to the SMS communication platform. In 2014, SAM was implemented for **9** MHPs funded by DJEBTKE and **7** MHPs funded by KUKM under 2013 budget year. Results of the inspection were submitted to each office with confidentiality.

Support for KUKM is in line with the Memorandum of Understanding (MoU) signed between ESDM and KUKM in June 2014, through which ESDM supports infrastructure development, while KUKM encourages the establishment of cooperatives at the beneficiary communities.

KUKM programme has a rather different approach compared to other government funded off-grid rural electrification programmes. In this initiative, the Ministry provides the grant directly to the selected local 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.

A **Final Report on MHP Technical Review for DJEBTKE 2014** (GIZ, 2015) was provided to DJEBTKE and a **Final Report on MHP Technical Review for KUKM 2014** (GIZ, 2015) was provided to KUKM in 2014.



*Operator gets a first-hand experience on how to operate and check the turbine.*



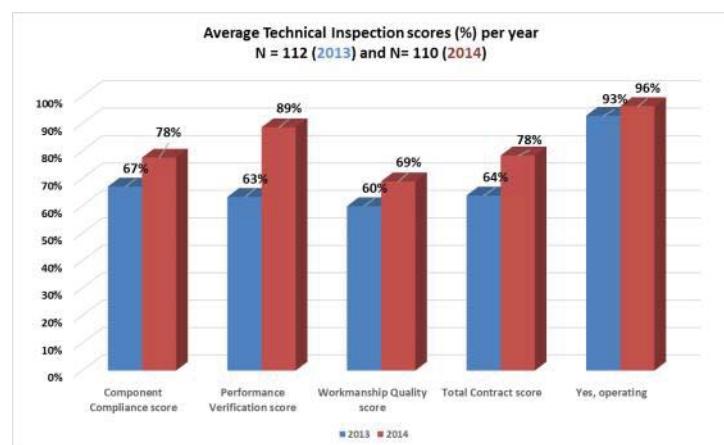
*Measuring water flow in the channel using current-meter.*

# Solar Support

EnDev ID provided extensive support to DJEBTKE's programme for **110** solar mini-grids (PVVP) installed across Indonesia. These sites were constructed within the state's budget year of 2013. Using the MSP the objective was to assess component compliance, performance verification and workmanship quality of the installations and is a continuation of same support in the previous year, where 112 PVVPs constructed in 2012 were inspected.

EnDev ID contracted international and national expertise to undertake the technical inspections, as well as train the VMT, collect baseline data and introduce a communication platform to advise beneficiary communities further. During the review a total of over 100000 photographs and almost 3000 survey sheets were evaluated, according to a standardised evaluation methodology, and the summarised findings and recommendations for each site submitted to DJEBTKE. A **Final Executive Report on Technical Review of PVVP** (GIZ, 2014) was provided to DJEBTKE in October 2014. Comparing the quality of the PVVPs showed remarkable improvements, as contractors took the feedback from the previous year to put greater efforts into enhancing the quality of their installations.

Extensive support to  
DJEBTKE's programme  
for **110** solar mini-  
grids (PVVP) installed  
across Indonesia



*Quality inspections and the resulting feed-back to contractors by DJEBTKE, ensure accountability of contractors. This in turn has led to significant improvements in the quality of PVVP installations within only one year.*



*This PVVP installation on a small remote rocky island demonstrates the installation challenges faced by contractors.*



*Of the 119 PVVP installations scheduled for inspection from April to July 2014, there are 9 sites could not be inspected. This brings to total PVVP sites supported in 2013 and 2014 by EnDev ID to 222 sites. The total distance travelled using air, road, boat and on-foot exceeded 160000 km. Indeed the logistical effort in delivering materials and constructing most PVVP sites is substantial, and the achievement of the Indonesian solar contractors should be complimented.*



# PUE Support

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 also supports in capacity building for the entrepreneurs and cooperatives' management.

In pursuance of encouraging business development at MHP sites, EnDev ID conducted ten packages of 3-day entrepreneurship training through Business Capacity Development (BCD) initiative by end 2014. A total of **146** rural entrepreneurs and cooperative managers were trained. The training comprises topics on business identification, marketing, human resources, investment and access to loan, bookkeeping and business planning. Syllabus is currently only in Indonesian.

A total of **146** rural entrepreneurs and cooperative managers were trained



*Rural entrepreneurs learn how to run a business in BCD training.*



# Sumbawa



## Testimonial

**"I hope this (entrepreneurship) training could help us improving the facility and infrastructure for the coffee farmers in Tepal Village in making better products."**

**Ahdar,**  
Chairman of Cooperative Puncak Ngengas,  
42 members.

# Capacity Building

EnDev ID capacity building efforts in 2014 were substantial and catered for various different stakeholders. In 2014 alone, trainings were conducted for **624** VMT members, **80** field facilitators, **16** PVVP inspectors as well as **146** entrepreneur and cooperative members. From the general community training and awareness raising events conducted on site, an estimated 15000 people were introduced to new knowledge about energy in general and renewable energy infrastructure in particular.

In order to streamline its community training, and consolidate the different training materials produced over the years, EnDev ID published a **Village Management Team Training Manual - A practical guide for rural electrification trainers and facilitators** in November 2014.

These capacity development measures do not include official presentations and web-based seminars given at various third-party events, such as the DJEBTKE's CONEX 2014, UGM's ASTECHNOVA 2014, DJEBTKE FGD for PVVP Contractors 2014, Training on RE: MHP for Rural Development in ASEAN region, Earth Camp for Indonesian scouting organisation, and TUEWAS Rural Energy Sub-Group.

Over **866** VMT  
members,  
entrepreneurs,  
facilitators & inspectors  
trained this year



*Hands-on participatory training is a key methodology in training courses*



### Testimonial

**"The (entrepreneurship training) method is really good, although for entrepreneurs like us, to add more practical activities would be better. We also hope to receive advanced training afterwards."**

**Noh Mautakai,**  
Chairman of Cooperative Beringin, 135 members.

# Sustainability Monitoring

## Energi Desa

Energi Desa (literally means: Village Energy) is the migration of the SMS-communication platform BReIDGE into a more user-friendly and expandable format. It is now jointly operated with an Indonesian based social enterprise “8villages”.

Energi Desa cooperates with three national mobile operators in providing communication service to the rural communities at reduced rates. Registered rural users can now send free messages to EnDev ID for technical troubleshooting advice and administration guidance for their off-grid MHP or PVVP systems. EnDev ID also uses Energi Desa to regularly send information and tips regarding maintenance, management, and general knowledge relevant to rural communities. Contact details for Energi Desa are distributed at EnDev ID-supported sites during site visits.

Over 1000 messages have been processed to date and the next challenge will be to recruit a network of volunteering experts to respond to SMS queries.

## Key Performance Indicator (KPI)

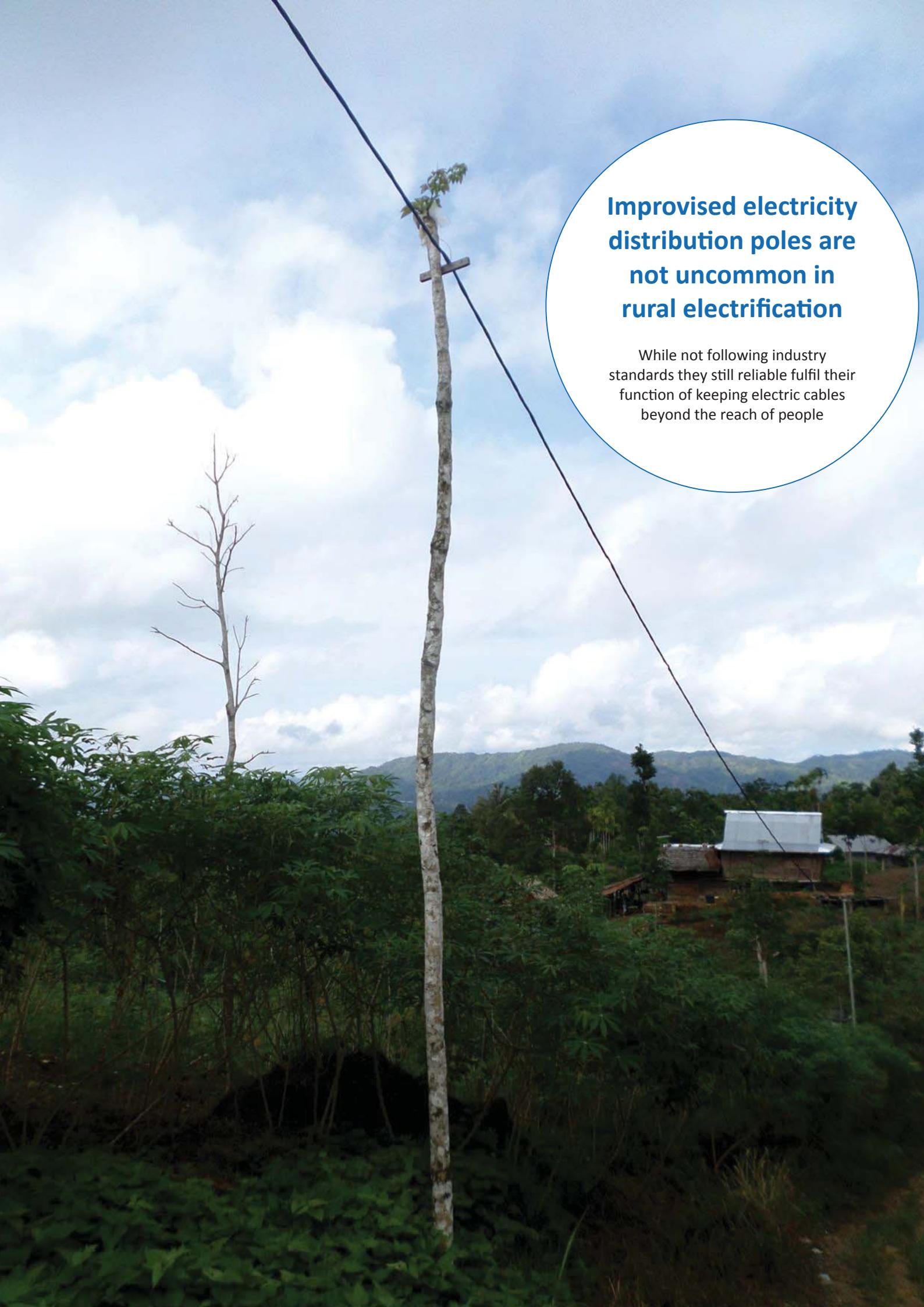
EnDev ID continues to conduct Key Performance Indicator (KPI) surveys at all supported sites. The surveys provide baseline data for comparison with future follow-up surveys, and also the contact details for VMT members. The latter is vital, as it allows them to register with Energi Desa, while also offering the means for EnDev ID to periodically monitor the performance of the site. Exact site coordinates are also recorded for integration into RE-Map. Currently EnDev ID has **444** KPI surveys on record.



*Contact details to Energi Desa are displayed on posters generally mounted at the community centre or powerhouse. A more simple contact number "2000" is now used in the system.*



*EnDev ID allocates a unique identification number to each site. This number is also spray painted to the powerhouse.*



**Improvised electricity distribution poles are not uncommon in rural electrification**

While not following industry standards they still reliable fulfil their function of keeping electric cables beyond the reach of people

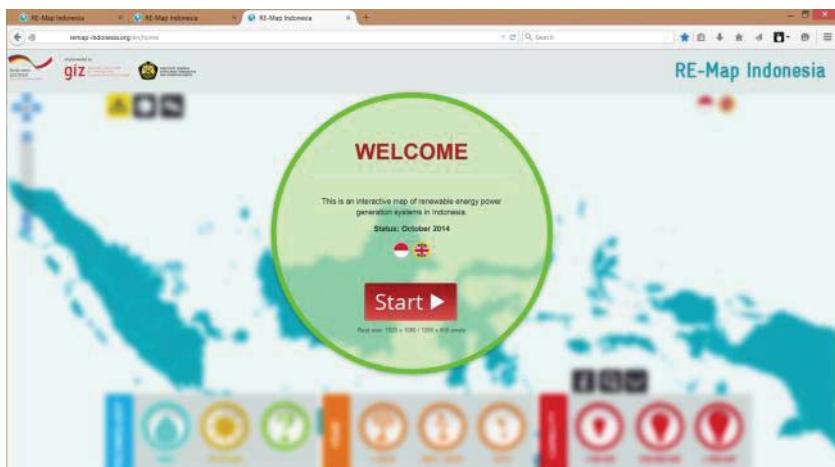
# Knowledge Management

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 continuously seeks to provide user-friendly pragmatic information to different stakeholders using various formats and means of distribution.

Of particular achievement is the finalisation of the Indonesia **Rural Electrification Map** or RE-Map (<http://remap-indonesia.org>). This interactive, on- and off-line geolocation platform lists all EnDev ID-supported sites and is being expanded to include non-EnDev sites as well. The data availability for the latter remains a challenge however. RE-Map's primary purpose is to collect and maintain site data in order to facilitate electrification planning.

EnDev ID launched an updated website ([www.endev-indonesia.org](http://www.endev-indonesia.org)) as part of fostering greater social media presence and being able to provide easier public access to information. Photographic impressions are now shared on Instagram, current news posted on Facebook, and videos placed on YouTube. A campaign activity to promote rural electrification utilising renewable energy was initiated under the name "Light in Dark".

There are **10** new and/or enhanced knowledge materials this year



RE-Map currently contains 517 MHP and PVVP sites, with a combined installed capacity of 9.4MWeL.



One of "Light in Dark" campaign posters showing impact of lighting through rural electrification.

# Outlook 2015

EnDev ID will maintain its services and commitments to Indonesia's rural electrification ambitions until 2018. EnDev ID's technical support has evolved into a comprehensive Mini-grid Service Package (MSP) which comprises technical quality improvement assessments, community capacity development, and monitoring and evaluation mechanisms. In the coming year EnDev ID will continue with its MSP approach, but will also put greater focus on sector development interventions.

The MSP is a cost-effective, time-efficient, robust and flexible instrument to assess the quality of a mini-grid installation. Coupled with a peer-to-peer feed-back mechanism to contractors, the MSP can rapidly lead to improvements in installation quality. For 2015, EnDev ID will pursue the integration of the MSP into DJEBTKE's tender evaluation and installation commissioning processes, and will build more national expertise in conducting the technical inspections. Over time, this will ensure that DJEBTKE has an accessible pool of national expertise. Current indications are that the MSP will be deployed at about 20 MHP installation and 80 PVVP installations.

By providing the MSP to other Indonesian stakeholders, data on off-grid mini-grids can be collected and consolidated. Already RE-Map provides insights into the exact locations of over 500 mini-grid installations. For 2015, EnDev ID will continue this data consolidation process, which will encourage informed decision-making on Indonesia's rural electrification ambitions. Other monitoring and data collection systems will also be explored, so that DJEBTKE has access to a user-friendly up-to-date tool for developing its future strategies.

EnDev ID puts great emphasis on sustainability measures. While DJEBTKE focuses on technical implementation, other Government agencies support rural electrification through establishing community skills. For instance KUKM empowers cooperatives to utilise electricity productively, while KKP has an extensive community preparation and mentoring approach. DJEBTKE has cooperation agreements with both KUKM and KKP, and EnDev ID will support these partners in satisfying their agreement objectives.

It is EnDev ID's experience that support closer to beneficiaries communities is vital. Some of this is being addressed by the VMT training and Energi Desa directly at village level. However, a key player in sustainable rural electrification are district and provincial authorities. They are the link between national development objectives, and on-the ground impacts. EnDev ID will explore means to build capacities and skills at this intermediate level. This may include streamlining the asset hand-over process from DJEBTKE, establishing contacts with VMTs and training programmes on renewable technologies and community facilitation.



*At the end of the day rural electrification is meant to empower people and the country's future generation*

## Annex A: Project Activity Forms

EnDev ID compiles PAF as means to concisely summarise activities of significant scope.  
The PAFs for 2014 are listed in this annex.



<b>Title:</b>	<b>Driver:</b>	Robert Schultz
<b>DJEBTKE PVVP 2014</b>	<b>Co-driver:</b>	Amalia Suryani
<b>Objective:</b>		
To conduct technical inspection, VMT training and data gathering at 119 PVVP installed under DJEBTKE rural electrification programme		
<b>Output:</b>	<b>Start:</b>	1 March 2014
1 110 confidential PVVP technical evaluation forms	<b>Finish:</b>	1 November 2014
2 110 KPI questionnaires		
3 Executive Inspection Report		
4 Focus Group Discussion event with PVVP contractors		
5 Revised PVVP technical checklists		
<b>Activity overview</b>		
<p>"DJEBTKE PVVP 2014" was a continuation of the PVVP (solar PV mini-grid systems) support initiative for DJEBTKE in 2013. Under this project, the same specialist international and national technical consultants were recruited. Inspection checklists and guidelines were slightly revised, but remained consistent with the 2013 inspection, in order to ensure direct comparison. 110 PVVP were finally inspected and all documentation (individual technical summary sheets, <b>Executive Report Technical Review of Photovoltaic Village Power (PVVP) Systems 2014</b> (October 2014) and <b>Indonesia Solar Mini-grid Programme Executive Overview Report</b> (December 2014) submitted to DJEBTKE within deadline. In addition on-site training on operation, management and administration of PVVP for VMT members, and general community sensitisation was also conducted. DJEBTKE FGD with contractors held on 20 November 2014.</p>		
<b>Activities:</b>	<b>Partners and service providers involved:</b>	
1 Recruit and finalise contract with international consulting team	DJEBTKE (instruction, technical contracts)	
2 Obtain mandate confirmation from DJEBTKE and submit to District Authorities to inform them of inspection	GOPA intec, Germany, international technical consultants (service provider)	
3 Obtain all contractor contracts from DJEBTKE (technical specifications only) and prepare component checklist	1 National technical consultant (service provider) subcontracted to GOPA intec	
4 Obtain site coordinates from contractors	87 District Authorities (briefing, mandate, accompaniment)	
5 Review and update checklists and questionnaires, all training materials, VMT books (with consultants)	10 PVVP contractors (site data, logistical support)	
6 Conduct 5-day training course for inspectors (survey, VMT, photography, measurements)		
7 Coordinate inspections of PVVP sites (8 teams, 3 months) with consultants		
8 Evaluate inspection findings, compile and submit Technical Summary Sheets to DJEBTKE		
9 Compile Executive Report of Technical Review of PVVP for DJEBTKE and present findings to DJEBTKE (confidential)		
10 Prepare presentation for FGD with contractors		

<b>Title:</b>	<b>Driver:</b>	Amalia Suryani
<b>Support Activities for MHP (SAM)</b>	<b>Co-driver:</b>	Erwina Darmajanti
<b>Objective:</b>		
To conduct technical review, VMT training and KPI surveys at 24 MHPs under rural electrification programme of DJEBTKE (11 sites), KUKM (11 sites), and IEC/ICED (2 sites)		
<b>Output:</b>	<b>Start:</b>	December 2013
1 Executive Report to DJEBTKE and KUKM	<b>Finish:</b>	February 2015
2 Technical review reports of 19 MHP sites (9 DJEBTKE sites, 8 KUKM sites, 2 IEC/ICED sites)		
3 KPI questionnaires of 19 MHP sites		
4 Updated MHP technical review checklists		
<b>Activity overview</b>		
<p>The Support Activities for MHP (SAM) adopts Mini-Grid Service Package (MSP) which comprises technical inspections, VMT training, baseline survey and introduction to the SMS communication platform. From 11 MHPs sites funded by DJEBTKE in 2013 budget year, SAM was implemented only in <b>9</b> sites, due to uncertainty of construction completion. From 10 MHPs sites funded by KUKM in 2013 budget year, SAM was implemented in <b>7</b> sites, because 1 site in Sintang was not completed by the end of consultancy contract period, and 2 other sites were supported through ISRE. Additionally, SAM was applied in <b>1</b> MHP in Sumbawa which has been handed over to local cooperative. Other than the aforementioned support for 17 MHPs, SAM also provided support to <b>2</b> community-based MHPs funded under ICED grant programme.</p> <p>Results of the technical review were submitted to each office with confidentiality in November 2014. Executive report for DJEBTKE and KUKM, however, could not be submitted at earliest time due to the high variability in the MHP completion time.</p>		
<b>Activities:</b>	<b>Partners and service providers involved:</b>	
1 Obtain mandate confirmation from DJEBTKE, KUKM, and IEC for MHP support	DJEBTKE, KUKM, ICED	
2 Recruit and finalise contract with four national MHP consulting teams	4 consultancy teams (CV Ceba Power, CV Tekno Asri, PT Entec, 2 technical consultants)	
3 Obtain contractor contracts for DJEBTKE contractors	Cooperatives (for KUKM sites)	
4 Review and update technical review form, questionnaires, and all training materials	Local authorities	
5 Conduct 1-day preparatory meeting with consultancy teams	Contractors/project developers	
6 Conduct technical review, VMT training, KPI surveys to 19 MHP sites		
7 Submission by consultants		
8 Evaluate technical review findings, compile and submit report to EBTKE, KUKM, and IEC/USAID		
9 Compile Executive Report		

**Note:**

IEC: PT Indonesia Environment Consultant  
ICED: Indonesia Clean Energy Development

<b>Title:</b>	<b>Driver:</b>	Erwina Darmajanti
Rural PNPM Institutional Strengthening for Renewable Energy (Rural PNPM ISRE)	<b>Co-driver:</b>	Amalia Suryani/Robert Schultz
<b>Objective:</b>		
Endev Indonesia through Rural PNPM ISRE provided support to the capacity building of Rural PNPM facilitators with the purpose of transferring and installing the knowledge and working mechanism of Technical Support Unit (TSU) within Rural PNPM. The MHP-TSU is a working unit established in 2009 to support the construction of over 130 MHPs under Green PNPM in Sumatra and Sulawesi.		
It is expected that ISRE support could improve the facilitator's skill in doing social preparation and assisting the target community during construction process, and thus at the end the overall MHP performance could be improved. On the other side, the project also provided support to build the capacity of Village Management Team (VMT) members in managing, operating and maintaining MHP scheme independently.		
<b>Output:</b>	<b>Start:</b>	1 February 2014
1 Project activity report	<b>Finish:</b>	31 August 2014
2 Technical review reports of 82 MHP sites (80 PNPM sites, 2 KUKM sites)		
3 KPI questionnaires of 82 MHP sites		
4 Two (2) facilitator trainings		
5 Six (6) VMT trainings		
<b>Activity overview:</b>		
In order to reach the objectives, the project adopted Mini-grid Service Package (MSP) consisting four (4) activities namely: technical review, VMT training, TOT or facilitators training, and KPI survey.		
During project implementation, 82 MHPs have been facilitated by a team of five local consultants (one coordinator, one assistant coordinator and three technical team members). The implementation itself started on 10 March 2014 with facilitator and VMT training in Sulawesi Selatan, and then continued with field surveys on the second week of March 2014. All work in Sulawesi Selatan was completed in the first week of May 2014. After Sulawesi Selatan, the team proceeded to Sulawesi Barat and conducted the first training in 18 May 2014. After all sites were surveyed and reviewed, the works completed in 31 August 2014.		
<b>Activities:</b>	<b>Partners and service providers involved:</b>	
1 Recruit of local consultants	Rural PNPM Authority in Sulawesi Barat	
2 Facilitator trainings	Rural PNPM Authority in Sulawesi Selatan	
3 VMT trainings	5 local consultants	
4 Kick-off meeting with consultants		
5 Evaluate technical review findings, compile and submit Technical Summary Report		
6 Evaluate technical review findings, compile and submit Technical Summary Report		
7 Compile Executive Report		

<b>Title:</b>	<b>Driver:</b>	Amalia Suryani
<b>Business Capacity Development (BCD)</b>	<b>Co-driver:</b>	Erwina Darmajanti
<b>Objective:</b>		
To conduct business development training for rural community at ten (10) MHP sites funded by KUKM and managed by local cooperatives. The cooperation with KUKM was meant to establish a stronger PUE and cooperative basis for an MHP.		
<b>Output:</b>	<b>Start:</b>	May 2014
1 Project activity report (in Indonesian only)	<b>Finish:</b>	August 2014
2 Ten (10) on-site business development trainings		
3 Business and cooperative profile		
4 Book of story from the field (draft)		
<b>Activity overview</b>		
BCD is a complementary activity in conjunction with the technical MHP support for KUKM. In 2013, EnDev ID signed an MOU with KUKM to support its rural electrification programme of developing 10 MHPs operated and managed by cooperatives. The MHP itself is expected to serve productive activities during the day. Such productive use of energy is seen as sustainability measures to improve rural development. From this activity, a total of 146 rural entrepreneurs and cooperative members trained.		
Trainers are experts with CEFE (Competency Based Economies Formation of Enterprise) certificate experienced in business consultancy and capacity building. The training comprises topics on business identification, marketing, human resources, investment and access to loan, bookkeeping and business planning. Syllabus is currently only available in Indonesian.		
<b>Activities:</b>	<b>Partners and service providers involved:</b>	
1 Exploration on business training pool expert	KUKM	
2 Recruit 2 CEFE trainers	Galuh Consultant	
3 Preparatory meeting for designing training modules	Target cooperatives	
4 On-site trainings (spread over four months)		
5 Reporting		
6 Compiling a book of story from the field		

<b>Title:</b>	<b>Driver:</b>	Atiek Puspa Fadhilah																
SMS Gateway: BReIDGE – Energi Desa	<b>Co-driver:</b>	-																
<b>Objective:</b>																		
Energi Desa (developed from BReIDGE) aims to provide the service to disseminate knowledge and exchange information through question and answer between the community and experts in rural electrification and renewable energy field.																		
<b>Output:</b>	<b>Start:</b>	January 2013																
1 Energi Desa, web based application	<b>Finish:</b>	On-going																
2 SMS content about rural electrification and renewable energy																		
3 Committed group of experts involve in Energi Desa																		
4 Subscribers from rural communities and related stakeholders in rural electrification																		
<b>Activity overview:</b>																		
<p>First development of SMS communication platform (named BReIDGE), an in-house web-based application that serves monitoring purposes for EnDev ID supported sites. It has been running for the last 1.5 years, until it is merged with an open platform in October 2014, which enables subscribers to send and receive data free-of-charge from the GSM providers. This later mechanism, called Energi Desa, is in collaboration with 3 Indonesian GSM providers, namely: Telkomsel, XL, and Indosat, which provide particular service that ease the communication with mobile technology using short-number: 2000.</p> <p>Energi Desa aims to reach the rural communities with mini-grid RE systems through dissemination of knowledge on renewable energy. The initiative comprises technology development, promotion of the platform, engaging users both rural communities and stakeholders, also maintaining content about technological and socio-economic aspects. It requires subscription process to get and send information within the network. The liaison with GSM providers are conducted by an Indonesian IT developer, while the content development is in collaboration with an Indonesian university and experts.</p> <p>Energi Desa broadcasts a series of SMS (called e-book) to the subscribers. It is also able to conduct surveys as well as question and answer communication between registered experts and rural communities (users). BReIDGE is now shifting to Energi Desa platform, although BReIDGE still receives reports and questions from communities. BReIDGE is able to do data calculation, while Energi Desa focuses on managing communication among the users.</p>																		
<table border="1"> <thead> <tr> <th><b>Activities:</b></th> <th><b>Partners and service providers involved:</b></th> </tr> </thead> <tbody> <tr> <td>1 Developing web-based application BReIDGE</td> <td>National consultancy team</td> </tr> <tr> <td>2 Content management for SMS knowledge</td> <td>Pusat Studi Energi (PSE) Uni Gajah Mada</td> </tr> <tr> <td>3 Developing Energi Desa</td> <td>8villages</td> </tr> <tr> <td>4 Hosting and co-location for BReIDGE</td> <td>D'Cyber</td> </tr> <tr> <td>5 Acquiring special number “2000” and mobile application</td> <td>Telkomsel, XL, Indosat</td> </tr> <tr> <td>6 Maintaining daily activities of Energi Desa (survey, broadcasts, maintain web, server)</td> <td></td> </tr> <tr> <td>7 Connecting Energi Desa with BReIDGE</td> <td></td> </tr> </tbody> </table>			<b>Activities:</b>	<b>Partners and service providers involved:</b>	1 Developing web-based application BReIDGE	National consultancy team	2 Content management for SMS knowledge	Pusat Studi Energi (PSE) Uni Gajah Mada	3 Developing Energi Desa	8villages	4 Hosting and co-location for BReIDGE	D'Cyber	5 Acquiring special number “2000” and mobile application	Telkomsel, XL, Indosat	6 Maintaining daily activities of Energi Desa (survey, broadcasts, maintain web, server)		7 Connecting Energi Desa with BReIDGE	
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5 Acquiring special number “2000” and mobile application	Telkomsel, XL, Indosat																	
6 Maintaining daily activities of Energi Desa (survey, broadcasts, maintain web, server)																		
7 Connecting Energi Desa with BReIDGE																		

<b>Title:</b>	<b>Driver:</b>	Ricky Ariwibowo
Rural Electrification Map in Indonesia (Re-Map Indonesia)	<b>Co-driver:</b>	Robert Schultz
<b>Objective:</b>		
To initiate data value addition in order to increase data exposure and appreciation through an interactive map, which could be accessed both online and offline.		
<b>Output:</b>	<b>Start:</b>	January 2014
1 RE-Map website ( <a href="http://www.remap-indonesia.org">www.remap-indonesia.org</a> )	<b>Finish:</b>	August 2014
2 Manual of RE-Map operational and maintenance		
<b>Activity overview</b>		
<p>In order to reach the objective, the project gathered all MHP and PVVP sites data to be imported to RE-Map. The data collected consists of location coordinate, connected household, connected SI, connected PUE, installed capacity, commissioning date, and funder.</p> <p>After all data are collected, they are imported to RE-Map database. Currently RE-Map contains 517 locations of both sites which are supported and not-supported by EnDev ID. A total installed capacity of 9.5 MWel. and connection to 48339 households are recorded in RE-Map.</p>		
<b>Activities:</b>	<b>Partners and service providers involved:</b>	
1 Specifying user requirements	Depttech	
2 Data collection		
3 Database development		
4 Map development		
5 Importing database to map		

## Annex B: List of Knowledge Materials

EnDev ID produced a number of knowledge materials which are intended for internal use and also have been distributed externally to various stakeholders as well as available on EnDev website as downloadable softcopies. The knowledge materials have been produced till 2014 are listed in this annex.



## Guides

VMT Training Manual - A Guide to Rural Electrification Trainers and Facilitators (GIZ, 2014)  
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 Report on MHP Technical Review for DJEBTKE 2014 (GIZ, 2015) (confidential)  
Final Report on MHP Technical Review for KUKM 2014 (GIZ, 2015) (confidential)  
Final Report Rural PNPM Institutional Strengthening for Renewable Energy (GIZ, 2015) (confidential)  
Final Executive Report on Technical Review of PVVP (GIZ, 2014) (confidential)  
Dokumentasi Pengembangan Ekonomi Produktif Koperasi Pengelola PLTMH (GIZ, 2014)  
Laporan Akhir Pelatihan Peningkatan Kapasitas Pelaku Usaha Koperasi Pengelola PLTMH (GIZ, 2014)  
Final Executive Report on Technical Review of PVVP (GIZ, 2013) (confidential)  
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)  
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

No	Full Name	Content	Year	Languages
01.	Villagers of Napajoring Have Access to Electricity Now	MHP Napajoring is part of power plant development for productive economy escalation programme, that was built through the funding from the Indonesian Ministry of Cooperative and Small and Medium Enterprises and supported by the District Government of Tobasa.	Dec 2014	Indonesian + English
02.	Capacity Building for Entrepreneurs of MHP Management	The training purpose is to increase the competencies of rural entrepreneurs in relation to micro hydro power plant programme, and it is expected that there will be sustainability development in the productive use of energy through the utilization of electricity from the MHP.	Dec 2014	Indonesian + English
03.	Technical Aspect of SMG	SMG maintenance is important to ensure all components function well. Regular maintenance is the key factor towards sustainability.	Sep 2014	Indonesian + English subtitles
04.	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
05.	Global Hydro Workshop 2013	The 5 <sup>th</sup> GIZ Micro Hydro Power Workshop was held in Indonesia from April 15 -22, with the support of the GIZ Sub-Saharan Sector Network and Energising Development.	Apr 2013	Indonesian + English
06.	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
07.	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
08.	Solar Energy to provide electricity to the community	Solar energy maintenance and sustainable operation.	Jun 2013	Indonesian
09.	Solar Energy –Solok	Solar energy and the application of the monthly tariff system for sustainability.	Apr 2013	Indonesian

No	Full Name	Content	Year	Languages
10.	<b>Micro Hydro Power Plant</b>	Electricity is a very efficient energy form for reducing work load, making tasks easier and providing access to education and entertainment.	Jan 2013	English
11.	<b>Administration</b>	Administration is activities related to record-keeping or book-keeping which are an essential part of the MHP management.	Jan 2013	English
12.	<b>Financial Management</b>	Financial management, done by the "accountant" who regulates and controls all MHP financial aspects, including book-keeping and reporting cash flow.	Jan 2013	English
13.	<b>Maintenance</b>	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
14.	<b>Electricity Utilisation</b>	Appropriate electricity usage can improve the quality of life in rural communities. They can extend their productive or entertaining activities by using electricity.	Jan 2013	English
15.	<b>Commissioning</b>	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
16.	<b>Case-MHP Construction in Mesakada</b>	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
17.	<b>Case-MHP Utilisation in Lisuan Ada</b>	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
18.	<b>Current Meter</b>	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
19.	<b>Easy-flow</b>	Instruction to flow measurement using conductivity meter easy-flow. Easy-flow is measuring equipment to measure flow river.	Feb 2013	Indonesian + English subtitles
20.	<b>Flow Measurement by Float Method</b>	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
21.	<b>Head Measurement by Plastic Tube</b>	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
22.	<b>Method of MHP Construction Implementation</b>	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
23.	<b>Productive Use of Energy</b>	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
24.	<b>MHP Operational</b>	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
25.	<b>MHP Institutional Setup</b>	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
26.	<b>Formulation of Village Regulation and Monitoring System</b>	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

No	Full Name	Content	Year	Languages
27.	<b>MHP Financial Management</b>	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
28.	<b>Head Measurement by Pressure Gauge Method</b>	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
29.	<b>Socialisation of Institutional Setup</b>	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
30.	<b>Stake Out to Determine Water Surface Elevation</b>	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
31.	<b>Supervision and Monitoring of MHP Construction</b>	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
32.	<b>Tendering Process</b>	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
33.	<b>The Role of TSU within Green PNPM</b>	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
34.	<b>Verification and MHP Potential Survey</b>	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



## **Energising Development**

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