Indonesia Domestic Biogas Program

2019
ANNUAL REPORT

Turn Waste Into Benefits with **BIRU**

Indonesia Domestic Biogas Program

Annual Report 2019

Implemented by

rumah energi

Supported by

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ENERGI DAN SUMBER DAYA MINERAL

KEMENTERIAN SOSIAL
REPUBLIK INDONESIA

Hivos
people unlimited

Table of Content

Abbreviations

APBD	*Anggaran Penerimaan dan Belanja Daerah* (Regional Budget)
APBN	*Anggaran Penerimaan dan Belanja Negara* (State Budget)
ASS	After Sales Service
Bappeda	*Badan Perencanaan Pembangunan Daerah* (Regional Development Planning Agency)
Bappenas	*Badan Perencanaan Pembangunan Nasional* (National Development Planning Agency)
BIRU	*Biogas Rumah* (Domestic Biogas)
BSNI	*Badan Standarisasi Nasional Indonesia* (National Standardization Agency of Indonesia)
BSC	Biogas Service Center
CPO	Construction Partner Organization
CSR	Corporate Social Responsibility
CSV	Corporate Share Value
CUCO	Credit Union Counselling Office
DAK	*Dana Alokasi Khusus* (Special Allocation Fund)
DGNREEC	Directorate General of New, Renewable Energy and Energy Conservation
DME	Dimethyl Ether
EnDev	Energizing Development
EUR	Euro
FGD	Focus Group Discussion
GIS	Geospatial Information System
HIVOS	Humanist Institute for Cooperation with Developing Countries
IDBP	Indonesia Domestic Biogas Program
INKOPDIT	*Induk Koperasi Kredit* (Credit Unions)
JARGAS	*Jaringan Gas* (gas distribution network)
KEN	*Kebijakan Energi Nasional* (National Energy Policy)
KIVA	US-based non-profit organization, the world's first online lending platform connecting online lenders to entrepreneurs
KOBO	A suite of tools for field data collection for use in challenging environments
KUR	*Kredit Usaha Rakyat* (Credit for small-medium enterprise)
LPG	Liquefied Petroleum Gas
LPO	Loan Partner Organization
LPDB	*Lembaga Pengelolaan Dana Bergulir* (Revolving Fund Management Institute)

MEMR	Ministry of Energy and Mineral Resources
MFI	Micro Finance Institutions
NBPSO	National Biogas Program Support Office
NGO	Non-Governmental Organization
NTB	*Nusa Tenggara Barat* (West Nusa Tenggara Province)
NTT	*Nusa Tenggara Timur* (East Nusa Tenggara Province)
PBPO	Provincial Biogas Program Office
PC	Provincial Coordinator
PE	Poly-Ethylene
PLN	*Perusahaan Listrik Negara* (State Electricity Company)
PJT II	*Perum Jasa Tirta II* (Water Supply Company of Indonesia)
QC	Quality Control
QI	Quality Inspector
RESCO	Renewable Energy Service Company
RF	Rabobank Foundation
R&D	Research and Development
RPJMN	*Rencana Pembangunan Jangka Menengah Nasional* (National Medium-Term Development Plan)
RUEN	*Rencana Umum Energi Nasional* (National Energy Masterplan)
SDG	Sustainable Development Goal
SEM	Search Engine Marketing
SME	Small Medium Enterprise
SEO	Search Engine Optimization
SME	Small-Medium Enterprise
SNI	*Standar Nasional Indonesia* (Indonesian National Standard)
SNV	A Netherlands Development Organization
SOP	Standard Operating Procedure
TOT	Training of Trainers
VER	Voluntary Emissions Reductions
VPA	Voluntary Project Activity
YRE	*Yayasan Rumah Energi* (Rumah Energi Foundation)

Executive Summary

Program Name:	Reporting Period:
Indonesia Domestic Biogas Program	01 January 2019 - 31 December 2019

Indonesia Domestic Biogas Program (IDBP) is a multi-stakeholder's program which has purpose to disseminating a renewable energy through build a small-scale household biodigester system called Biogas Rumah (BIRU) in around 11 provinces since 2009. IDBP's main goal is to create market for domestic biogas. By the end of 2019, IDBP has constructed about 24,767 units of BIRU with several deferent household scale from 4 m3 to 12 m3.

Since the beginning of implementing market-based biogas sector, IDBP has been partnering with several institutions to help potential users in accessing credit facilities. i.e: Nestle, RaboBank Foundation, KIVA, dan Credit Unions. At the same time, government provided enormous supports through APBN, APBD, DAK program which provided subsidy (full and partial subsidy) for bio-digester installation. This condition has boosted the adoption of domestic biogas. On the other side, the government's full subsidy has made the cattle farmers relied more on government's procurement rather than self-financing or accessing credit for the construction of biogas. Along the years, the cost of digester construction constantly increases as a result of economic inflation. In addition, farmers own less cattle, and funding from Nestle or other dairy cooperatives only available in limited number. Those aspects have contributed in the declining adoption of bio-digester over the past few years. To improve market penetration beginning in 2019, the program introduced Biomiru (Biogas Mini Rumah) to respond to market demand for more affordable biodigesters. In addition, a pilot project on spatial market analysis was conducted to give better insights for decision making in making biogas market grow faster and smarter. Market penetration and product diversity are expected to boost market growth for domestic biogas sector.

Closely working with the Indonesian Ministry of Energy and Mineral Resources, IDBP is implemented by Yayasan Rumah Energi (YRE) with funds made available by EnDev (Energising Development), the Norwegian Embassy and partners in promoting access to a modern and sustainable form of renewable energy for rural people in 13 provinces. In 2019, EnDev continues the funding supports by developing the capacity of key stakeholders, and working with them to promote sustainability of demand, supply and a supportive enabling environment. In the second semester of 2019, the support from EnDev focused on the provinces with the strongest demand and highest performing Construction Partners, namely Central Java and Yogyakarta, East Java, West Nusa Tenggara, and South Sulawesi. The target is to facilitate the construction of 4,500 units of biogas from July 2019 to December 2020. In 2019, there are 39 CPOs under Indonesia Domestic Biogas Program, including 19 CPOs in the 5 provinces supported by EnDev. As an effort to create more resilient CPOs, capacity development on business incubation and acceleration was provided to the construction partners by using social entrepreneurship approach.

Bio-digester is a well-established technology that can generate a large revenue opportunity to users and CPOs that supports the socioeconomic development in rural areas. To this end, a range of capacity development activities with social entrepreneurship approach were provided to users and CPOs in this program. Promotion and socialization activities were intensified in achieving the target of 4,500 units by the end of 2020. In the period of January to December, as many as 56 promotional and socialization activities were carried out in 5 provinces both offline and online.

Notwithstanding the efforts of developing a biogas sector in the country, IDBP was experiencing a decline in digester installation achievement figures in 2019 following the Government of Indonesia's decision to discontinue the biogas program through DAK funding. The promotion strategy was strengthened to engage not only the local government but also the community and the private sector in order to get funding support. Collaboration with more financial institution is the target for IDBP in 2019, in addition to the existing partnership with other credit providers such as MFI/CUCO, particularly in the context of supporting the CPOs to obtain working capital funds. Another innovation in funding aspect would be sought by joint funding or cost sharing between parties which needs to be advocated aggressively.

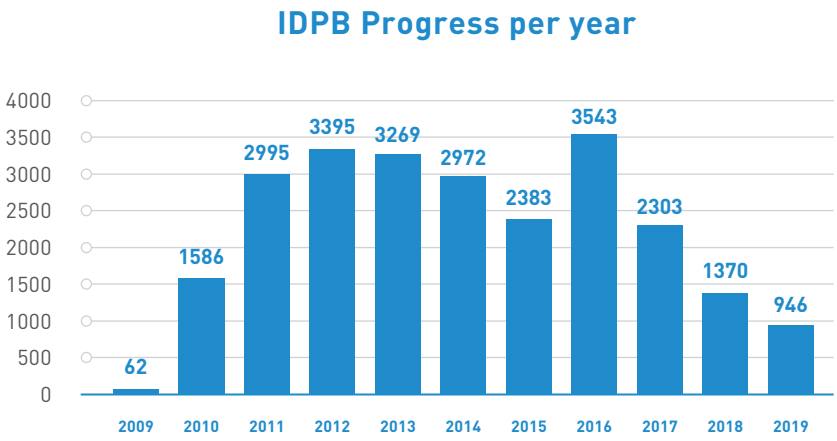
Another challenge of reaching the installation target is the cost of biogas construction which increases every year. The increasing cost had affected the biogas demand taking into account the potential user's ability

to pay. To address the problem IDBP has conducted a research to develop an affordable biogas product that will be standardized by the Indonesia Standard Agency (BSN). By providing an affordable biogas product, the traction for attracting the people (farmers) in need to access biogas will be higher. IDBP will continue to supervise the quality assurance in order to maintain high functioning rate, adapting to and promoting the technology consistently, facilitating financial access based on data, user profile to mitigate risks and advocate for strategic policies that can boost biogas deployment nationally.

Despite many of the challenges highlighted above, the biogas sector continues to recognize many opportunities for growth. Market-based opportunities arise to meet needs and solve supply or demand challenges. For the past 10 years, the IDBP has proved that bio-digester technology can provide significant benefits to rural household and the local economy in Indonesia. However, these benefits can only be achieved if those working in the sector collaborate closely to build ecosystems around the supply and demands. In this way, different parts of the ecosystem can support each other. Closer co-operation among relevant stakeholders will make it possible to create new jobs and business in rural areas, reduce the need for imported energy and make better use of waste products in this country.

1. Digester Construction

1.1. Number of digesters in year



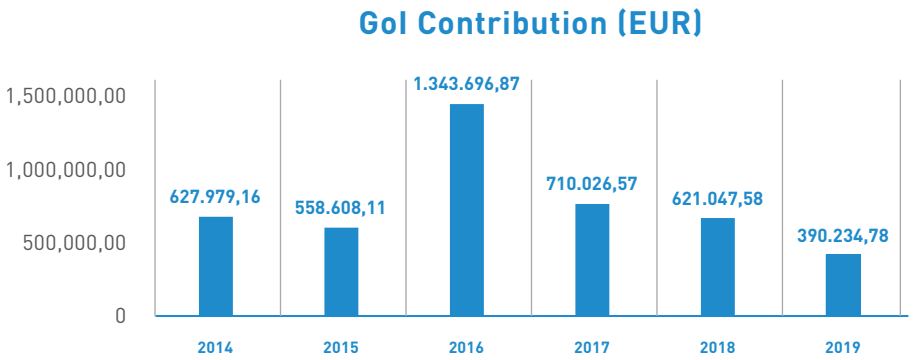
1.2. Number of people gains access to clean cooking energy

117,489 people have gained access to clean energy for cooking resulting from the construction of 24,767 units of digesters. In 2019 alone, 4,608 people have gained access to clean energy for cooking from 946 units of digesters.

1.3. Number of digesters per size of digester

Province	2009 – 2018	2019	1m³	2m³	3m³	4m³	6m³	8m³	10m³	12m³	20m³	Total
Lampung	518	42	1	-	-	435	64	36	9	15	-	560
West Java + Banten	1,542	140	1	-	-	531	944	93	21	91	1	1682
Central Java + D.I. Yogyakarta	3,632	262	4	-	1	974	2267	340	126	181	1	3894
East Java	8,176	114	1	-	-	160	4114	2864	652	499	-	8290
Bali	1,222	92	-	-	-	854	355	84	16	5	-	1314
NTB	5,019	135	6	1	-	4946	129	12	3	57	-	5154
South Sulawesi	2,596	136	1	1	-	1808	877	23	9	13	-	2732
NTT (Sumba)	1,116	4	-	-	-	639	423	45	8	5	-	1120
Central Sulawesi	0	21	1	-	-	20	-	-	-	-	-	21
Total	23,821	946	15	2	1	10,367	9,173	3,497	844	866	2	24,767

1.4. Funding sources for digesters



Year	Gov't	Gov't + user	Comp's 100%	Comp's + user	100% paid by user	
					Cash	Credit
2009 -2018	3,597	7,779	67	995	4,308	7,076
2019	496	147	40	192	43	28
Total	4,093	7,926	107	792	4,351	7,104

2. Quality Inspection and After sales service

2.1. QC and ASS

Year	Number of Digester built in year	Total of Digester in year	Total of Digester Quality Check	Completed ASS1	Completed ASS2	Total of After Sales Service Check
2009	62	62	62	62	62	62
2010	1,586	1,648	1,648	1,586	1,586	1,648
2011	2,995	4,643	4,631	2,983	2,983	4,631
2012	3,339	7,982	7,911	3,280	3,280	7,911
2013	3,269	11,251	11,128	3,217	3,217	11,128
2014	2,973	14,224	14,006	2,878	2,878	14,006
2015	2,383	16,607	16,191	2,185	2,185	16,191
2016	3,543	20,150	18,840	2,649	2,649	18,840
2017	2,296	22,446	20,428	1,801	1588	20,641
2018	1,370	23,821	22,363	774	96	21,415
2019	946	24,767	22,775	57	0	21,472

2.2. Job Creation

The biogas sector has considerable contribution in the absorption of labor. In 2019, a total of 946 biogas digesters have been built and there are 47 supply chain related jobs created from the program activities, including construction of bio-digester and the production of biogas appliances (e.g. stove, gas pipe, and manometer production). The workers have received training from IDBP on biogas installation in accordance to IDBP standards.

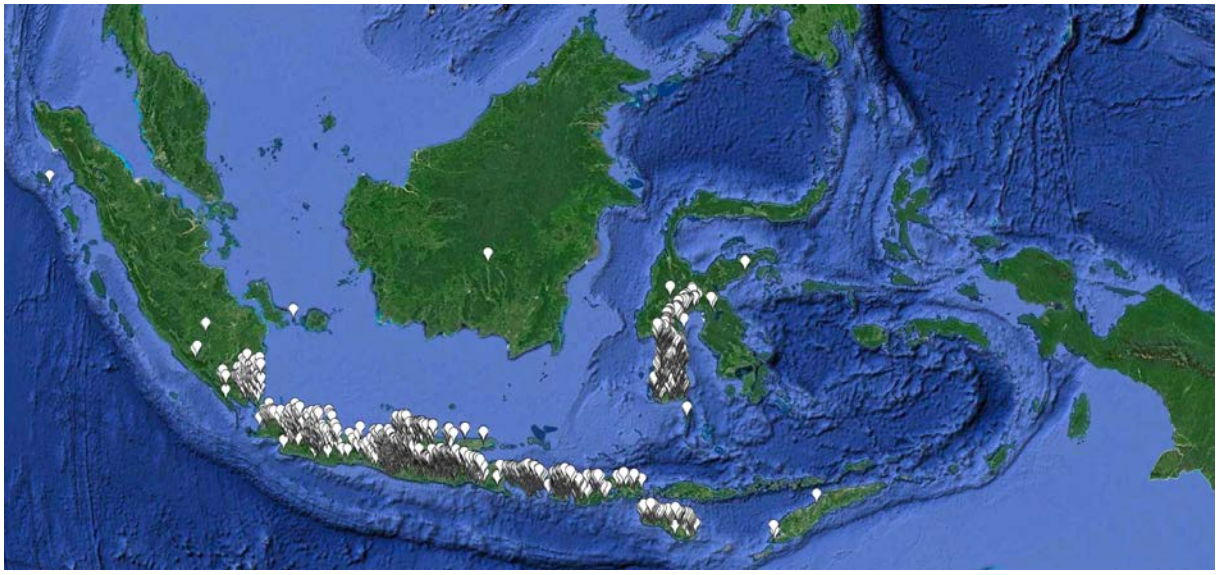
01. Introduction

The Annual 2019 Indonesia Domestic Biogas Program Report (IDBP Report), will give an overview on the domestic biogas sector development in particular on how the supply, demand and enabling indicators have been progressing.

Over the last 7 (seven) years Yayasan Rumah Energi (YRE) has been implementing Indonesia Domestic Biogas Program (IDBP), and running the National Biogas Program Support Office (NBPSO) as well as the Provincial Biogas Program Offices (PBPO) to maintain IDBP partners consistency in: (i) quality assurance of digesters when penetrating the early stage of the market; (ii) biogas promotion and (iii) after sales service.

In the second semester of 2019, the operational cost of IDBP is fully supported by Energize Development (EnDev). The 18 months Endev BIRU Period program focuses on strengthening and hand-over to YRE, developing the entrepreneurial skills and capacity of biogas SMEs, preparing the market for the phase out of subsidies, and strengthening the enabling environment. It is covering a core market area of four provinces with the strongest demand and highest performing biogas SMEs (Central Java and Yogyakarta, East Java, NTB and South Sulawesi). IDBP's target is to facilitate the construction of 4,500 units of biogas from July 2019 to December 2020.

Apart from consistent and regular demand, supply and enabling environment related activities, from July 2018 - 2019 implementation period the team organized the geo-tagging activities to record GIS data of almost 17,000 digesters in 10 (ten) provinces which includes collecting data on the functionality and performance status of these digesters. By the end of 2019, a total of 23,372 BIRU digesters have their GIS position recorded by the NBPSO *(more detail of geo-tagging activity as described in chapter 6)*.



Picture 1. Location of Domestic Biogas in IDBP GIS Database 2019

The National Energy Policy *(Kebijakan Energi Nasional/ KEN)* sets a target of 489.8 million cubic of biogas in 2025 where as by 2019 the DGNREEC-MEMR recorded 26.57 million cubic of biogas are in operation. As the current achievement is way below the 2025 target, policy advocacy to both central and local government is a priority specifically on how domestic biogas is placed within the energy mix in competition with LPG, Dimethyl Ether (DME) and gas distribution network *(jaringan gas/jargas)* proven by a roadmap for transition or a spatial data and the contribution of domestic biogas to relieving the pressure to the State


Credits: **Jin Panji**

Budget (APBN) from importing LPG and inefficiency in distributing subsidized LPG. According to the Biogas User Survey (BUS) conducted in 2019, the use of biogas reduces the usage of LPG in average 5,8 kg/month.

The Ministry of Energy and Mineral Resource (MEMR), in particular the Directorate of Bioenergy, Directorate General of New, Renewable Energy and Energy Conservation (DGNREEC- MEMR) had consolidated the national domestic biogas population data from IDBP, APBN/APBD, DAK, other ministries and private companies. By the end of December 2019, there are 47,485 digesters that were recorded under DGNREEC-MEMR database which represents the total number of domestic biogas in Indonesia including a fiberglass model, while BIRU database shows the total number of 24,767 constructed units by the end of December 2019.

Based on the study conducted by SNV Netherlands Development Organization in the year of January 2009, IDBP indicates that the potential for domestic biogas market in Indonesia could reach 1,000,000 units of digesters coming from 15,6 million cattle which could generate 2 million m3 of biogas in comparison to the to 489,8 million m3 of biogas mandated by the National Energy Masterplan *(Rencana Umum Energi Nasional/ RUEN)* by 2025 as part of the 23% renewable energy target set by the KEN. This means that to achieve these targets by 2025, biogas would not only aim to replace LPG by targeting markets beyond farmers and cattle farmers but it has to scale up through a more advanced technology such as compressed bio-natural gas, variety of feedstocks and eyeing for cattle industry, etc.

In order to scale up and expand the current market, businesses would need to be involved to be able to tackle the increasing cost of concrete digesters by promoting biogas energy to the market and business can be done in a commercial basis where companies are able to charge reasonable prices through competition. In the same time, it requires a set of policy measures at the national and regional level to address marketing and financing issues in biogas uptake.

In the current situation, IDBP has not been able to reach the potential of the market due to heavily subsidized LPG. Onwards, IDBP will continue the advocacy effort to reduce dependency on subsidized LPG with the hope that the demand for bio-digester will grow.

02.
Program Objectives

Picture 2. One of biogas user in DI. Yogyakarta

Overall objectives:

To contribute to economic prosperity, and support the development of a green economy and mitigation of climate change in Indonesia through the scale up of a national biogas sector development program, to improve waste management and emission reduction in the livestock and dairy sector.

Specific objective:

To promote the development of a market-oriented domestic biogas sector that provides access to affordable clean energy for livestock and dairy farmers through dissemination and application of biogas technologies with support to finance and enabling policy environment.

03. Institutional Setting

The IDBP is implemented based on a Contribution Agreement with the Netherland Embassy in 2009 and an implementation agreement in 2011 with the Directorate of Bio Energy (Directorate for New Renewable Energy and Energy Conservation) under the Ministry of Energy and Mineral Resources. In its implementation, IDBP received technical support from SNV and works directly with a national non-government organization Yayasan Rumah Energi (YRE).

A National Biogas Advisory Committee was established in July 2011.The mandate of the Committee is to monitor programme progress and endorse initiatives, including representatives of relevant government agencies, DGNREEC, civil society and the supporting donors.

By 19th November 2012, in the framework of localizing management, Hivos transferred the IDBP's mandate to Yayasan Rumah Energi (YRE) through a sub-grant contract as the only direct implementing partner, while Hivos is focusing the role on project monitoring and evaluation, supervising the implementation of IDBP and strengthening YRE as an institution. As IDBP's partner organization, YRE is responsible for implementing the field activities and gradually taking over the key responsibilities of IDBP. YRE is currently employing 35 professional staff members in Jakarta and eight provinces of Indonesia to support the implementation of renewable energy program. YRE branches in the provinces serve as PBPOs which in charge of local implementation, and are tasked to synchronize and liaise with energy agencies and other relevant government agencies at provincial and district levels.

By implementing IDBP over the period 2013 – 2019, YRE has been able to build expertise in domestic bio-digester engineering, potential user profiling, building the capacity of Construction Party Organization (CPOs), facilitating access to credits, user behaviors, adapting new monitoring and evaluation tools and other sector development activities. The organization has also developed other programs and services that can be used as leverage to the sector development, namely Climate Smart Agriculture which is a byproduct of the IDBP program itself emphasizing the food, energy and water nexus and circular economy at grassroot level. The foundation is also engaging private sectors to support domestic biogas adoption through business models that are benefiting companies' business as well as supporting the foundation itself.

In terms of institutional development, the significant change in the IDBP program is the gradual transfer of responsibility from Hivos to YRE to sustainably run the program. To pursue this, YRE is persistently built the discussion with the local government as well as with related stakeholders for having a written agreement i.e. Memorandum of Understanding (MoU) with provinces/ districts where IDBP is implemented. Endorsement of local governments will allow continuous discussion among stakeholders to jointly support the sector development. Furthermore, it is also important to reach out to wider audience to increase the profile of IDBP.

New players in the sector ranging from SMEs to industrial level businesses, NGOs and communities are the key elements in ensuring successful sector development strategies. The strategies are to include advocacy to Ministries and local governments; investment opportunities for affordable technologies; promotion and campaigns to users in collaboration with NGOs and communities. Additionally, the role of CPOs as the main driver of biogas market expansion is the core of institutionalization of the IDBP program.

04. Overview

January - December 2019

4.1 Development of Demand Side

No.	Indicator
4.1.1	Product and service diversity
4.1.2	Market penetration & systems in use
4.1.3	Willingness to pay
4.1.4	Consumer awareness & Perception

4.1.1 Product and Service Diversity

Mini Domestic Biogas (BioMiru)

In establishing market growth, the focus on biogas for energy should be diversified towards creating multiple products and using biogas optimally through innovative solutions. In 2019, IDBP introduced BioMiru *(Biogas Mini Rumah)* to respond to market demand for more affordable biodigesters. Using easy to find poly-ethylene material available all over the country, this new model could save of up to 70-80% construction cost. BioMiru is suitable to match the need of farmers with less affordability due to smaller numbers of the required livestock. As this model requires small space affordable cost, BioMiru can fit the need of urban dwellers for household recycling system by turning kitchen organic waste into biogas and fertilizer.

During this reporting period, series of BioMiru 'Training of Trainers' were provided to masons, supervisors and IDBP engineers. Additionally, training on constructing Poly Ethylene (PE) digesters was also provided to CPOs. The introduction of the new product has resulted to the first commercial request in June 2019 for a unit of 1m3 and a unit of 2m3 in West Java. The 1m3 product could generate 400-liter of biogas, while for the 2m3 could produce 700-liter which can be used for 1-2 hours of cooking. A significant progress has been achieved in Lombok City – West Nusa Tenggara Province where the local Government campaigns for zero waste and supports the community to manage their kitchen waste. In 2019, a total of 13 unit of BioMiru have been built in 6 provinces in Indonesia. Onwards, IDBP will massively promote BioMiru to potential users as well as to the national and local government for wider penetration of the product in the country.

As a means of strengthening the market penetration of 'BioMiru' model, IDBP is working closely with *Badan Standardisasi Nasional* (Indonesia National Standards Agency) for the development of new standard to acknowledge as well as to register the newly-introduced 2m3 PE model. In the late 2019, IDBP signed a partnership agreement with the BSNI (Indonesia Standardization Agency) to conduct a research on the eligibility of Biomiru PE digester. This research begins in early 2020 and is conducted in collaboration with The Ministry of Energy and Mineral Resource (MEMR), in particular the Directorate of Bioenergy, Directorate General of New, Renewable Energy and Energy Conservation (DGNREEC- MEMR). The development of the standard and the registration of the model is very crucial as it would be very significant to accelerate the adoption of the model. In addition, the SNI registration-along with the requirements-will become a reference for Indonesian government in conducting the procurement of low-pressure biogas project.

Picture 3: The construction of BioMiru and the BioMiru digester

During this reporting period, a series of activities had been conducted to initiate the work, including 1 (one) FGD in December 2019 involving MEMR and other related parties to start discussing on the draft development. IDBP aims for the SNI of BioMiru to be finalized by 2021.

4.1.2 Market Penetration and System in Use

Market penetration refers to strategies adopted by IDBP to be able to create a niche in the already existing market. In 2019, there are 946 new users who gained access to IDBP/BIRU domestic biogas. To enhance the market penetration and increase the demands on domestic biogas, IDBP partners and staff conducted series of socialization events targeting dairy/livestock farmers, academia, private companies and local governments.

A total of 47 socialization/awareness meetings were conducted in 10 provinces in 2019. IDBP team constantly encouraging the construction and/or lending partners to be more motivated in conducting socialization and promotion to attract new potential customers. The potential users are expected not only to be involved in the socialization but to also follow through with the agreement to install biogas. The challenge and also the new strategy is to have not only CPO but also local micro finance institutions to attend and provide information on financing opportunities.

Province	Number of Meeting
Bali	1
Central Java & D.I. Yogyakarta	13
West Java & Banten	2
East Java	3
Lampung	9
NTB	6
NTT (Sumba)	7
South Sulawesi	3
Central Sulawesi	2
Jakarta	1
Total	**47**

Table 1: List of Socialization Meetings to Promote Biogas and/or Bio-slurry in January – December 2019
(For details of List of Socialization and Awareness Meeting per month please see Annex 3)

The key takeaways from the market penetration strategies are:

I) using spatial data to analyze market potential based on cattle ownership;
II) better user profile into a more detailed assessments including willingness and ability to pay;
III) user experience and behaviors.

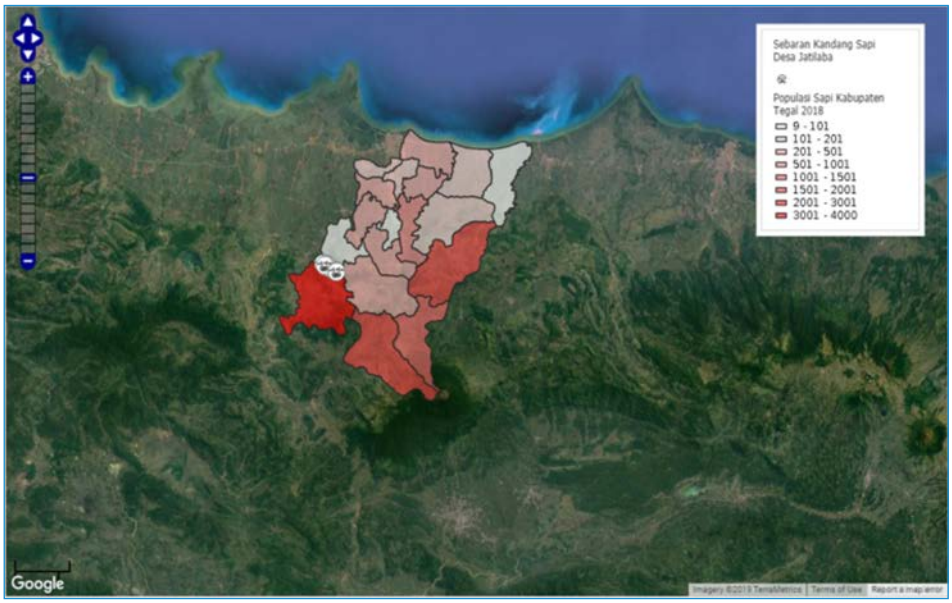
Data support, fundraising from CSR and facilitating access to micro finance are mobilized to increase CPOs capability in looking for potential markets and assist potential users willingness and ability to pay. Become price competitive is a swaying factor for customers to use biogas digester. A research was conducted by IDBP to develop an affordable biogas product that will be standardized by the Indonesia Standard Agency (BSN). Providing an affordable biogas product can help gain traction in previously untapped market segments.

Picture 4. Community awareness meetings to promote bio-digester technology

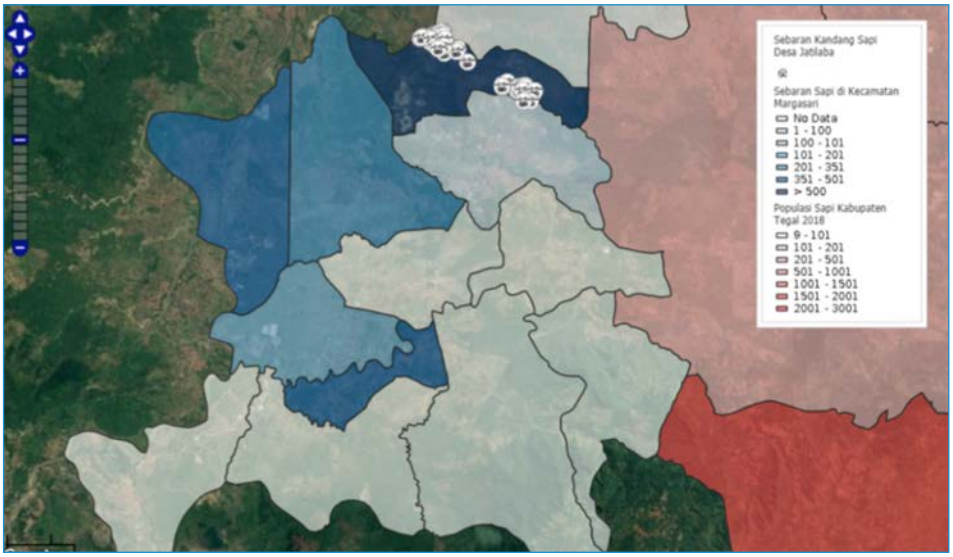
'Customer mapping' enables IDBP to identify the biogas markets where they can find the highest concentration of the best potential customers. In June - July 2019, a GIS consultant was recruited to conduct a pilot project on mapping of biogas potential areas in Tegal District, Central Java. A technical guideline was developed in mapping biogas potential by combining geospatial methods with conventional survey techniques that enables users to visualize the spatial market distribution of data in maps taking into account livestock population. This form of presentation yields better insights in better understanding the market segments that helps IDBP team in carrying out an effective market penetration approach based on the demands in the community. The GIS-based mapping includes the following steps:

1. Making a Work Map by preparing data on the areas with large livestock population that is used as a basis to select the areas for field survey.
2. Identification of target areas and field survey
3. Survey data processing
4. Upload data to WebGIS

The next step of the pilot project is to collect information from various sources to determine potential areas for biogas sectors, such as dataset of Village Potential Statistics (PODES) which is available in the Central Statistics Agency of Indonesia.



Picture 5. Information on the distribution of cattle population in Tegal District, Central Java



Picture 6. Information on the distribution of cattle population in Margasari Subdistrict, Tegal, Central Java

Picture 7. Heatmap potential biogas in Jatilaba Village, Margasari, Tegal, Central Java

4.1.3 Willingness to Pay

IDBP provides a combination of subsidies and loans which makes it affordable for rural households to purchase biogas plants. From 946 units constructed in 2019, 52% users received full assistance through local government budget (APBD), 36% users share the costs with government (DAK/APBD) or private companies' grant through CSR program, and 3% financed their biodigesters independently through credit and cash.

Province	BIRU bio-digesters	Gov't 100%	Gov't + user	Comp's 100%	Comp's + user	100% paid by user	
						Cash	Credit
Lampung	42	0	0	0	40	0	0
Banten and West Java	140	120	1	9	1	0	9
Central Java & Yogyakarta	262	239	1	3	0	4	15
East Java	114	0	0	0	105	7	2
Bali	92	29	0	0	46	17	0
NTB	135	101	15	7	0	12	0
NTT (Sumba & Flores)	4	4	0	0	0	0	0
South Sulawesi	136	3	130	0	0	3	0
Central Sulawesi	21	0	0	21	0	0	0
Total	**946**	**496**	**147**	**40**	**192**	**43**	**28**

Table 2. No. of bio-digesters built in 2019; fully funded by government, partly funded or 100% paid by users

The category of "100% cash" on the above table means the construction cost is fully funded by the users after IDBP subsidy. The category of "loan" represents the number of bio-digester funded through a credit scheme channeled through cooperative members of MFIs that work in collaboration with IDBP i.e.: Nestle and/or Rabobank Foundation.

The funding by Government and Company (through CSR) are divided into 2 schemes: fully funded or co-sharing; fully funded means there is no cash or in-kind contribution from the user, while co-sharing means there is contribution from more than 1 party (government/company + user + IDBP).

Government Support

Although Special Allocation Fund (DAK) was completely cut-off since January 2019, the government funds remain one of the primary funding for biodigesters construction. In 2019, the Government spent a total of EUR 390,234 for domestic biogas. The figure has significantly decreased in comparison to EUR 642,809 that was spent in 2018.

In some provinces, local government continued funding supports allocated from Regional Budget (APBD) and Village Funds *(Dana Desa)*. Collaboration models between IDBP, government, private sector and community funding are being evaluated and explored to find a more sustainable and efficient business models. For instance, the province of West Nusa Tenggara and South Sulawesi achieved the highest biogas construction for the last three (3) years. As government funding channeled through DAK program came to an end, the demand for biogas plants shrunk due to price increases. To increase market penetration, promotion strategy was later changed by advocacies to local government, the community and the private sector for funding support.

Contribution from GoI – 2019	Province	IDR	EUR
Agriculture Agency	Bali	391,500,000	24,416
Energy and Mineral Resources Agency	Banten	195,000,000	12,162
Energy and Mineral Resources Agency	D.I. Yogyakarta	2,088,200,000	130,236
Village Budget Fund	West Java	12,500,000	779.5
Energy and Mineral Resources Agency	West Java	866,600,000	54,048
Environment Agency	West Java	75,000,000	4,678
Agriculture Agency	West Java	86,000,000	5,363
Transmigration and Manpower Agency	West Java	90,000,000	5,613
Village Budget Fund	Central Java	10,000,000	623.5
Community and Village Government empowerment Agency	West Nusa Tenggara	507,600,000	31,133
Energy and Mineral Resources Agency	West Nusa Tenggara	507,600,000	31,658
Environment Agency of Central Lombok District	West Nusa Tenggara	168,000,000	10,478
Provincial Agreement	West Nusa Tenggara	100,000,000	6,237
Energy and Mineral Resources Agency	South Sulawesi	797,894,965	49,763
Village Budget Fund	South Sulawesi	26,288,644	1,640
Total		**5,922,183,609**	**368,828**

Table 3: Government Contribution for Biodigester Construction in 2019

Private Companies Contribution

In 2019, partnership with two big companies had been established to support IDBP Lampung and South Sulawesi Province. The JOB (Joint Operation Body) Pertamina and Medco at Tomori well in Banggai – Central Sulawesi is working with YRE to build 20 domestic biodigesters and an integration of Agriculture and Fishery programs. Farmers who live close to the oil well were involved in capacity building to utilize bio-slurry in vegetable garden, vermicomposting and accessing clean energy for cooking.

Towards reducing household expenses on cooking fuel and improving the economic capacity of the households, YRE has been partnering with PLN Lampung Regional which is a State Electricity Company the program of *PLN Membiru* Towards Energy Self-reliant Village program throughout the period 2016 - 2019. This partnership has achieved the construction of 40 biogas units and 1 compost house as a demonstration plot for fertilizer processing and vermicomposting.

The agreement between YRE and *Perum Jasa Tirta* (PJT) II, a state-owned company based in West Java Province, was entering its third phase. This collaboration successfully delivered the construction of 9 (nine) bio-digesters, 2 units of composting house and 5 units of vermicomposting house and worm castings fertilizer for dairy farmers in the center of dairy industry of Lembang and Parongpong district in North Bandung. The partnership aims at shifting farmers' habit of dumping the cow dung into the river by managing the cow dung as a valuable commodity. PJT II's main

business is supplying water to Jakarta, therefore good water quality is crucial for the company's business. YRE's business strategy is to utilize bio-slurry fertilizer and other organic products reach its maximum value, which will increase additional value of maintaining the operation of these bio-digesters. A similar principle can be a basic business model to be developed with future prospective corporate partners.

Picture 8: Digester cost sharing with PLN in Lampung

4.1.4. Consumer Awareness & Perception

Awareness of biogas uses and advantages is a key aspect for a proper development of domestic biogas. In IDBP's annual activity of Biogas User Survey (BUS) 2019, it was found that reducing the household expenditure is the main motivation of users to build bio-digester, while the slurry produced by biogas plant, is the second important factor that make them interested in building bio-digester.

To increase the trust of consumers to invest in this technology, public awareness should include general knowledge on the advantages of domestic biogas production as well as technical and economic aspects. Although almost all user in this program have had information about how to use and to maintain biogas digesters, they have less awareness on how to keep their biogas plant well-functioning. This insufficient knowledge may hamper a successful production of biogas and bio-fertilizer.

A biodigester performance is also determined by the quality of construction on which masons play an important role. IDBP provided 8-days job training on bio-digester installation to the masons who are part of IDBP's CPO partners. A 2-days refresher training is provided after the on job training. This approach is expected to reduce mistakes and increase productivity so that masons can provide highest quality bio-digester installation to the end-users. If biogas users are satisfied with their investments, they become effective marketing channels having a large impact on neighboring farmers. Thus, community awareness, training and education, play a critical role in increasing the adoption of bio-digester technology.

STORY 1

Developing sustainable agriculture with bio-digester technology

In 2017, the government of Central Sulawesi developed a policy on the management of cattle in line with their program to develop sustainable agricultural practices. To this end, Yayasan Rumah Energi, in collaboration with Joint Operating Body Pertamina-Medco E&P Tomori Sulawesi (JOB Tomori) and the Banggai Regency Government, introduced biogas technology to support the farmers in the management of potential organic waste and the development of organic fertilizer.

The inauguration of biogas demo plot within the framework of the Productive Economic Zone Development Program through Energy Conservation and Sustainable Agriculture took place on July 17, 2019. "We strongly support this programme at community level, as it brings big hopes on developing agricultural activities as well as management of organic fertilizer, especially biogas residue fertilizer", said Fahmi Arifudin Rizal, SSTP as head of Moilong sub-district.

Location of the biogas installations and supporting demo plots in Moilong Sub-district, Banggai Regency

The program emphasizes synergistic cooperation from various parties from the regency to the village level

The program is implemented in two villages, namely Sumberharjo and Slametharjo in Banggai Regency, Central Sulawesi. Twenty units of 4m3 household scale bio-digesters are built and used by local farmers in the two villages. Biogas becomes a means of supplying energy for daily cooking and for lighting, while the bio-slurry discharged from the digesters is used as organic fertilizer for agricultural production as well as freshwater fish farming and vermicompost. The application of biogas technology is expected to be a comprehensive effort in developing not only livestock activities, but also agricultural and fishery activities.

This overall program has proved successful in supporting regional government's program on sustainable agriculture, and in creating a system that gives economic and environmental benefits. The efforts to embrace cooperation and establish links between various different areas has built the two villages into productive economic zones. Investments that might seem impossible for rural communities has become a reality and profitable through co-operation.

4.2 Development of Supply Side

No.	Indicator
4.2.1	Suppliers & Business Networks
4.2.2	Sales Volume
4.2.3	Supply Chain
4.2.4	Warranties
4.2.5	Entrepreneurial Skills: • No. of user training • No. of other training

4.2.1. Supplier & Business Networks

The CPOs are key stakeholders to develop a domestic sector, as they deliver the end product that has to be of good quality, and they have to take ownership of the market in order to push national dissemination of their own products. The IDBP succeeds in developing institutional arrangements, as companies have been trained on domestic biogas construction to respond the large demand for domestic biogas plants, and finance institutions facilitate funding of the sector.

Province	2019	
	No. of CPO	No. of biodigester
Bali	3	92
Central Java & D.I.Yogyakarta	5	262
West Java & Banten	4	140
East Java	5	114
Lampung	3	42
NTB	4	135
NTT (Sumba)	1	4
South Sulawesi	13	136
Central Sulawesi	1	21
Total	**39**	**946**

Table 4. Number of CPOs partners in 2019

(The complete list of CPOs in provided in Annex 2)

Entering new biogas market requires a lot of resources and commitment from suppliers. In 2019, a selection process was undertaken to prospective construction partner institutions. To maintain the quality of construction and services, YRE also conducted a selection process to the existing partners and extended the partnerships only to those with good performances. It involved careful identification of the qualified construction organizations in order to ensure that they have the (potential) capacity to drive the sector and develop other actors' capacity as well. As a result, thirty-nine (39) CPOs signed an agreement with YRE to continue the cooperation in developing domestic biogas market. During the period of 2019, only 20 CPOs involved in biodigesters construction, while the rest of 19 CPOs only performed the After Sales Service. The program highlighted a decline in digester construction, particularly due to the limited funding, including low available of biogas loan, and the declining of government's procurement.

Although the number of CPOs has reduced in some provinces, the quality of work and the growth of business are being monitored constantly by the PBPO. Trainings on technical updates, quality assurance, by-products and business model canvas were also given to the top CPOs in the hope that their business will continue to grow. As an effort to create more resilient business, trainings on business incubation and acceleration by using social entrepreneurship approach was provided to the aforementioned CPOs Quality Inspectors.

4.2.2. Sales Volume

In 2019, from 946 units constructed there are 177 units self-funded by users and 127 units constructed in West Java through cooperative under RBF and East Java partly subsidized by Nestle.

Province	CPO Name	Units
Bali	UD. Cahaya Wana Bakti	10
	Yayasan Manikaya Kauci	3
	Yayasan Sastra Loka Samgraha	4
East Java	CV. Mitra Bumi Abadi	22
	CV. Karsa Tekad Mandiri	4
	KAN Jabung	10
	KUD Tani Wilis	51
	KUD Sumber Makmur	27
Lampung	Regol Mason Group	2
NTB	Sangkareang Mason Group	**12**
South Sulawesi	CV. Ritma Green Sinergy	**2**
	CV. Rezky Utama Masagena	**1**
West Java	Yayasan Kontak Indonesia	**9**
	Ujung Berung Mason Group	**1**
Central Java & D.I. Yogyakarta	Rumah Ilham	**2**
	Yayasan Sion	**1**
	Yayasan Trukajaya	**15**
		1
TOTAL		**177**

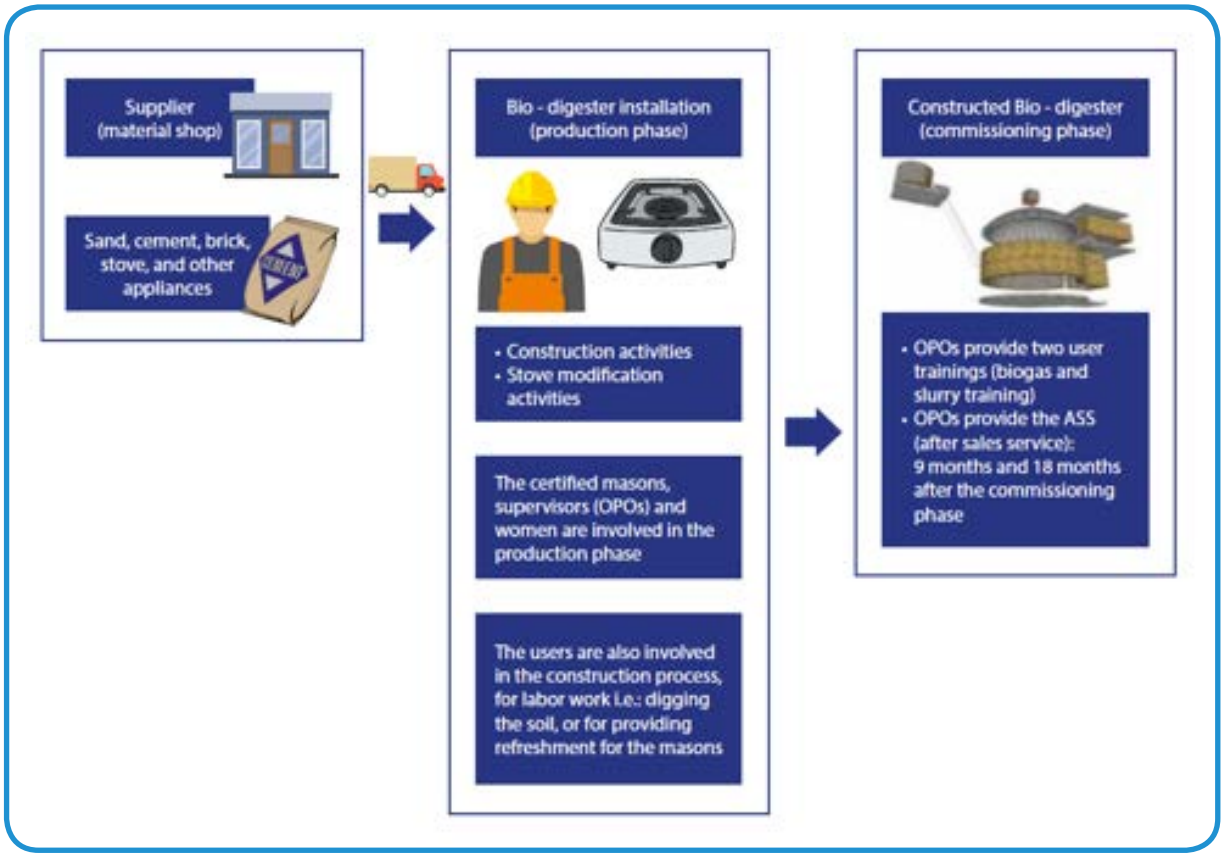
Table 5. Number of bio-digesters self-funded by users

The decline in digester achievement figures is still dominated by the Government of Indonesia's decision to discontinue the biogas program through DAK funding. Advocacies to local government to support biogas program has also been intensively carried out by the PBPSO. However in several provinces, the change of the Governor/Head of District affects the local government's appetite for expanding biogas program.

Another challenge of reaching the target is the constantly rising cost of bio-digester installation. This situation will affect to the biogas demand considering the potential user's ability to pay. To address the problem IDBP has conducted the research to develop reasonably prices biogas product that will be standardized by the Indonesia Standard Agency (BSN). By providing an affordable alternative, the traction for attracting the people (farmers) in need to access biogas will be higher.

4.2.3. Supply Chain

The biogas supply chain comprises a network between a construction company and its suppliers to produce and distribute a specific product to the end-user. This network includes different activities, people, entities, information, and resources. With the aim of ensuring the development of market-based biogas sector, IDBP has succeeded in developing complete supply chain system-from upstream to downstream, that takes account not only the provision of raw materials for construction (sand, cement, brick, stove and other appliances, etc.), but also knowledge and skill development to Construction Partner Organization (CPOs) and certified masons as shown in the diagram below.



Picture 9. IDBP supply chain scheme.

The quality of raw materials (sand, cement, brick stone, etc.) is inevitable for having s good quality biogas digester. To ensure sustainability, IDBP requires the constructions meets the national standard as stipulated in the document of Indonesian National Standard (SNI 7826:2012 and SNI 7927:2013).

To support the maintenance of biodigesters, IDBP is also working with high performing CPOs in each province to establish dedicated Biogas Service Centres (BSCs) that can ensure supply of appliances and aftersales services in order to resolve issues with appliance supply and gaps in CPO service provision.

Credits: ***Jin Panji***

4.2.4. Warranties

In ensuring bio-digester installation is being performed in a proper manner and in accordance with the design, the CPOs provide an official warranty for a period of 3 years upon the completion of digester installation. This warranty is spelled out in writing in a household agreement issued by the CPO and should be signed by the user prior the construction starts. The warranty provision is expected to overcome consumer hesitation in installing bio-digester.

The bio-digester built by IDBP should meet the minimum quality standard since partners must comply with SNI 7826: 2012 (Indonesia National Standard) in accordance to the procedure of concrete fixed-dome bio-digester installation. To apply appropriate standards, Quality Inspector conducts regular inspection to each bio-digester built by IDBP partners. In 2019, IDBP staff has inspected 412 units out of 946 bio-digesters.

Inspection during the construction (unit)	Inspection after the construction (unit)
18	394

The inspection target in IDBP proposal is 45% of the total bio-digester built in the current year, and the total inspections conducted by QI is 98% of the target in the proposal.

Year	Number of Digester built in year	Total of Digester in year	Total of Digester Quality Check	Completed ASS1	Completed ASS2	Total of After Sales Service Check
2009	62	62	62	62	62	62
2010	1,586	1,648	1,648	1,586	1,586	1,648
2011	2,995	4,643	4,631	2,983	2,983	4,631
2012	3,339	7,982	7,911	3,280	3,280	7,911
2013	3,269	11,251	11,128	3,217	3,217	11,128
2014	2,973	14,224	14,006	2,878	2,878	14,006
2015	2,383	16,607	16,191	2,185	2,185	16,191
2016	3,543	20,150	18,840	2,649	2,649	18,840
2017	2,296	22,446	20,428	1,801	1588	20,641
2018	1,370	23,821	22,363	774	96	21,415
2019	946	24,767	22,775	57	0	21,472

Table 6. Number of Quality Inspection and After Sales Service Quality Check

After sales service is an important activity to secure the continued operation of biodigesters. The IDBP procedure rules that each biodigester should be visited by CPO two times, 9 months and 18 months in after complete installation. The objective of the visit is to discharge the obligation of the CPOs to provide maintenance service and collecting information of digester as part of IDBP monitoring. As presented on the Table.6, a total of 21,472 units were inspected from After Sales Service done by CPOs and independent surveyor through geotagging activities during 2019.

4.2.5 Entrepreneurial Skills

Biogas sector development relates to the primary stakeholders in the value chain, primarily the construction companies and farmers who invest in a bio-digester construction consume biogas fuel and use bio-slurry.

User Training

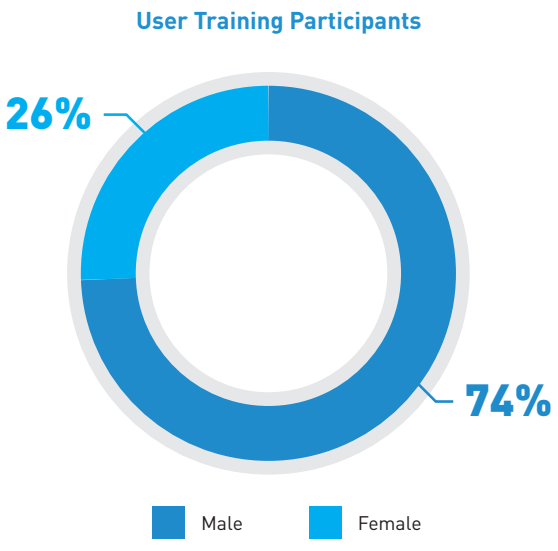


Chart 1. Percentage Male vs. Female participant of User Training

To ensure the well-functioning of bio-digester, CPOs are responsible in providing one day training on biodigester operation and bio-slurry production to users at the latest 3 months after completing the installation. Up to September 2019, trainings were provided to 192 users (143 male and 49 female) out of 478 users targeted. The number of trainings organized by CPOs was relatively low, particularly due to emphasis of CPOs in pursuing completion number of digester construction and their full engagement in Geotagging activity during this year.

Although a quick know-how on the operation of digester and the stove is provided to each user right after the construction is completed, yet, the BUS survey found that some users still have poor knowledge on feeding management of bio-digesters. A lack of training could affect the functionality of digesters and hamper users to gain maximum benefits from this technology. Series of reminder had subsequently been circulated to CPOs for discharging their duty in building the capacity of users in operating their domestic bio-digesters properly as part of the warranty effort and to utilize bio-slurry as an incentive to maintain its operation and sustainability. A combination of adequate training on maintenance, construction and strengthening the bio-slurry use program is expected to increase the adoption of bio-digester technology.

Picture 10: User Training held at user's house in South Sulawesi

Bio-slurry Training

A biogas digester not only provides clean and cheap energy, but also produces bio-slurry as a good organic fertilizer for crops. In 2019, a total of 213 users (or 23 % of constructed digesters) received bio-slurry training. As shown in Picture 11, the number consists of 159 male and 54 female participants.

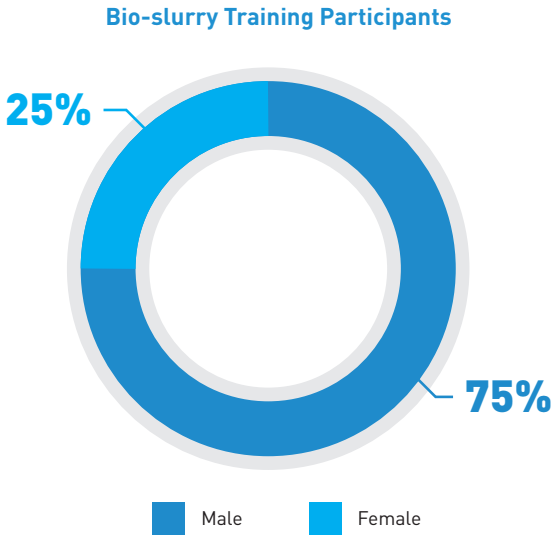


Chart 2. Percentage Male vs. Female participants of Bio-slurry training

Picture 11: Field class - discussion of the use of bio-slurry in intercropping onions and chilies

Training by Subur Plus

Whereas the biodigester technology is widely valued for its ability to meet the users' energy needs, bio-slurry has been considered a mere co-benefit that can be seen in the low utilization of bio-slurry in the 10 provinces of IDBP. Understanding and knowledge of using this organic fertilizer is limited since the technology of bio-slurry extension is new for them. There was indication of a decrease in the use of bio-slurry on agricultural land from 79% in 2017 to 73% in 2018. In August 2019, further training was conducted for 4 selected biogas users from 4 provinces to gain a deeper understanding of the importance of utilizing bio-slurry on agricultural land in D.I.Yogjakarta. This training was facilitated by Subur Plus, an Integrated Agroecological Farmer School, and discussed topics on the management of converting animal waste into bokashi as well as designing marketing strategy.

Training by Usaha Desa

To strengthen the knowledge and understanding of biogas users on productive economic ventures through the use of bio-slurry, a Bio-slurry Business Model Development Training was held in June 2019 in collaboration with Usaha Desa. The training activity was carried out for 12 biogas users from the D.I area Yogyakarta and 5 biogas users from the Central Java region. The participants learned the potential of bio-slurry and how to draw up a business plan and business model with financial planning.

Picture 13. Participants were learning to develop a business plan during Bio-slurry Business Model Development training

STORY 2

Biogas Service Centers

Business network plays a leading role in entering a new biogas market. For this reason, finding reliable partners that complement the service offering in the target market is good for business. To promote the sustainability of energy installation, the IDBP established RESCO (Renewable Energy Service Company) unit as new business model.

In the first semester of 2019, Rumah Energi focused on the selection of potential CPOs and project's procurement of service providers. Selection criteria was based on performance of each CPOs in pre-selected province and their potential contributions in biogas market development post Endev funding. After solid internal discussion, in mid-November 2019 Rumah Energi released four CPOs that will be groomed in 2020 (see table below).

No.	Name of BSC	Province
1	Rumah Ilham	Central Java and D.I. Yogyakarta
2	CV. Karsa Tekad Mandiri	East Java
3	Sangkareang Mason Group	West Nusa Tenggara
4	CV. Rizki Abadi	South Sulawesi

As an effort to create more resilient CPOs, YRE has partnered itself with Kinara, a consultation organization which focuses on business incubation and acceleration by using social entrepreneurship approach. In this scenario, Kinara will create modules and deliver Training of Trainers (ToT) to Quality Inspectors in charge in the project. The ToT will be conducted in the second week of March 2020 after the completion of baseline and needs assessment of the 4 (four) BSCs.

During first two months of 2020, Rumah Energi in cooperation with Kinara will conduct needs assessment in the four aforementioned CPOs to identify the challenges faced by selected CPOs. A problem-based training module will be developed by Kinara to be used during the training by Quality Inspectors to the selected CPOs.

Detailed implementation plan of Biogas RESCO is described below:

Activities	Time (2020)										
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Module development											
Training of Trainers											
Training on Field											
Accompaniment											
Monitoring											
End line Study											

4.3 Development of Enabling Environment

No.	Indicator
4.3.1	Policy – Stakeholder Engagement
4.3.2	Access to finance
4.3.3	Quality regulations, norms and standards
4.3.4	Market Information

4.3.1. Policy – Stakeholder Engagement

Supportive policies and government initiatives combined with institutional arrangements in IDBP may facilitate information, material and capital flows that connect supply and demand sides of the value chain. While growth in the biogas sector remained slow, the IDBP team continue to seek ways to integrate biogas activities into broader strategies and meet goals. In 2019, 12 consultation meetings were conducted with local/national government to continuously push the agenda on domestic biogas sector. Local governments play important parts in ensuring that legislation is implemented and imposed in the provinces, which make them important intermediaries for ministries and development organizations that aim to reach the rural population. IDBP has also been working with national and provincial governments for the last 4 years to maximize the mobilization of state budget and village budget.

To support the development of domestic biogas, IDBP has actively advocated the inclusion of biogas in RPJMN as one of energy access to clean cooking under the scenario for low-carbon development. RPJMN 2020-2024 has been stipulated through Presidential Regulation No. 18 of 2020. In the said planning document, unfortunately biogas is not mentioned as Government's target. Efforts on advocacy to the MEMR have been undertaken to increase coverage of the program namely conducting nationwide promotion event hosted by the Minister of Energy and Mineral Resources. The plan is still being discussed internally by the DG NREEC of the MEMR.

At provincial level, changing of Governor in South Sulawesi has affected the program as the support for biogas program, including the budget allocation, became quite challenging. Efforts have been carried out to improve coordination with the new government officials sitting in (Bappeda) and Energy Office. In West Nusa Tenggara, a stakeholder meeting was held to discuss the development of a Master Plan and Action Plan for waste management in North Lombok Regency with a focus on the Gili islands. The activity was initiated by the Denmark Embassy that later will have an MoU with Regency Office to collaborated on Waste, Energy and Agriculture, the G to G arrangement. In regard to this, the North Lombok Environment Agency welcomed the initiative of YRE to propose BioMiru as one of the waste management solutions.

In April 2019, IDBP team participated in a workshop of developing biogas sector in Indonesia organized by DG NREEC of the MEMR. As a follow up action, IDBP has shared data on program implementation to DG NREEC for data synchronization purpose. The information can be used as inputs in developing roadmap for achieving the target of the national energy mix in 2025.

In the first semester 2020, Central Java Provincial team plans to conduct FGD with EMR office, environmental service, social service and regional development. The FGD will discuss the biogas program to enter into the workplan of the local government. In South Sulawesi, the FGD will focus on bio-slurry promotion and be carried out in March 2020. The goal is to integrate the use of bio-slurry on crops into the agriculture policy which would directly impact the installation of more bio-digesters.

Over the years, IDBP has been engaging with a wide range of stakeholders in developing the biogas sector in the country. Partnerships with Nestle and Credit Unions, for example, aim at introducing and stimulating appetite of the MFIs in providing financing to biogas program as described in sub chapter 4.3.2. Coordination and approaches had been made to Nestle, RBF partners, CU cooperative network and also some of potential financial institutions to increase the number of new IDBP LPOs.

Credits: **Jin Panji**

STORY 3

Workshop on Developing Biogas Sector in Indonesia

Bogor, 30 April 2019

Over the last years, the Government of Indonesia put considerable efforts in developing the renewable energy (RE) sector and has formulated an ambitious target of a 23% share of RE by 2025. As the drive for renewable energy and alternative fuels continues, the biogas sector is being recognized as a potential solution to help meet sustainability goals. In the other hand, growth of the biogas sector continues to be limited due to many barriers that remain unresolved. Interacting with stakeholders, therefore, is a critical way to obtain feedback on issues, programs, and policies, which can directly influence the shaping of future strategies and activities.

In April 2019, IDBP participated in a workshop on the development of biogas sector in Indonesia organized by DG NREEC of the MEMR. Chaired by the Director of Bioenergy, the meeting delivered several action points, including a plan to create a Roadmap of the National Biogas Development for 2020 – 2025. A multi-stakeholder team to be established to assist the creation of roadmap in order to achieve the target of the national energy mix in 2025. The forum has agreed the roadmap will cover the achievement targets (quantity, capacity and gas production) and strategies to achieve a robust biogas industry in the country.

Pertinent policy, technical capacity, and financing are some of the challenges need to be addressed. This meeting outlined that achieving growth in the biogas sector will require constant progress in engaging stakeholders to eliminate or overcome these barriers. Accomplishments in supporting biogas within the policy and program arena requires a robust approach across the spectrum in order to create new avenues for the success of the biogas industry and to strengthen and reinvigorate the existing avenues.

4.3.2. Access to Finance

In 2019, IDBP lending partners had financed 13% or 127 farmers' bio-digesters from the total of bio-digesters built by IDBP's Construction Partners during the year. The Milk Cooperatives through Nestle's CSV partnership, Truka Jaya Foundation and Rabobank Foundation (RF) has stepped in to collaborate with IDBP by providing microcredit loans for farmers. The lending partners have disbursed EUR 21,545 loans to 127 famers in 2019. Since the beginning of the program, the loan for domestic biogas has supported 9160 farmers (37 % of total domestic biogas construction 2009-20019) or a total of EUR 2,710,874.

IDBP found that progress of constructed biodigesters through credit has been somewhat below expectations due to several factors. Recently, only 4 of Nestle's milk cooperative partners who are willing to distribute Nestle Biogas Loans align with Nestle's cooperative feasibility standards and to avoid high Non -Performance Loans (NPLs). The biogas loan disbursement from Credit Union partnership in some provinces were also slowing down due to many Primary CUs, especially in Central Java, East Java, South Sulawesi and NTB Provinces that have not been engaged as IDBP LPOs and CU is still looking for biogas market potential among its members. On the other hand, the cooperative partners of RF scheme did not distribute biogas credit during this period due to expiring partnership cooperation and have difficulties in returning loans to the RBF. A strategy was developed to identify a large group of cooperatives/private sectors/NGO with potential to become new partners of RF, from which 10 potential partners were selected in Central and East Java which have been submitted to RF as new pipeline by the end of January 2020.

Coordination and socialization meetings were carried out to approach CU cooperative networks, including new potential LPOs from other cooperative or peer to peer lending schemes which have resources for loan repayment collection system on the ground. As the result, 60 CU members would obtain biodigesters construction via CU credit in Jogjakarta and NTT province (Flores Island) in 2020 and CU credit to build BioMiru demo-plot in NTB.

Biogas Credit Provider	Number of Borrowers (Person)				Biogas Loans Disbursement (EUR)			
	2016	2017	2018	2019	2016	2017	2018	2019
KIVA	35	25	0	0	9,939	5,253	0	0
Credit Union	7	2	2	0	1,369	738	1,212	0
Rabo(Bank) Foundation	59	54	12	11	24,506	28,559	5,498	5,177
Nestle	282	238	131	87	88,390	77,479	46,360	35,734
KAN Jabung – East Java	4	108	1	0	1,830	27,307	229	0
Others	6	0	0	15	2,114	0	0	7.169
Total	**393**	**427**	**146**	**127**	**128,148**	**138,598**	**53,299**	**48,081**

Table 7. Progress of Biogas Loan Contribution in 2016 – 2019

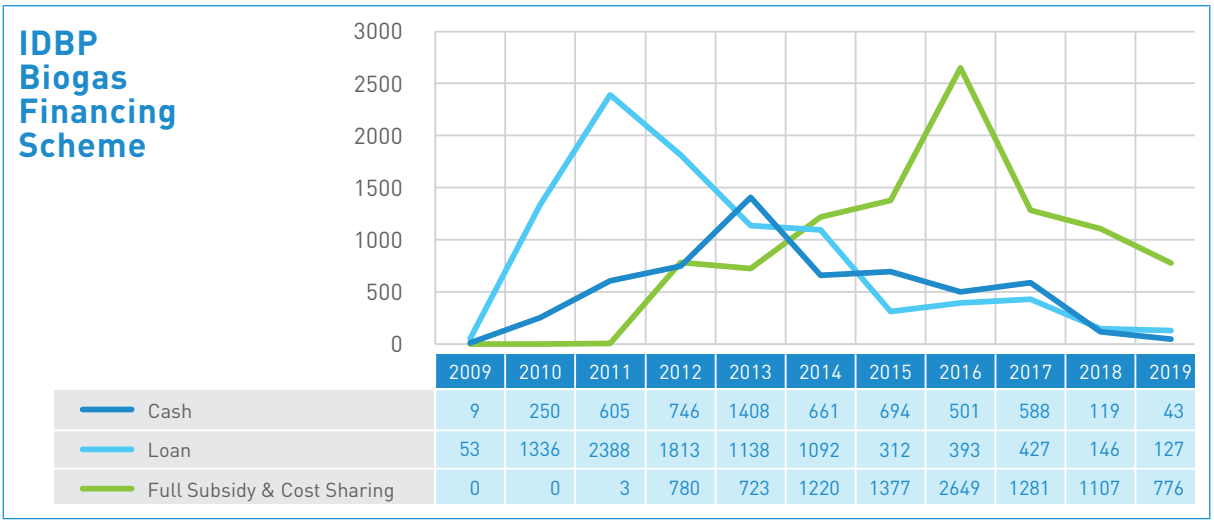


Chart 3. Progress of Biogas Loan Contribution in 2016 – 2019

IDBP is actively seeking new approaches and strategies to increase demand for biogas loan. The LPOs became one of main actors in developing the biogas market. The YRE, INKOPDIT/CUCO, RF and Nestle CSR have agreed that Biogas Loan Providers Institutions/LPOs were suggested to become active marketers for this technology. Continuous socialization to members/ customers and their implementing partner's network have been undertake to promote the biogas technology and loan scheme.

Based on the Picture 14, the IDBP experienced a sharp decline in biogas financing in 2019. A lack of business/ management capacity building among the MFIs, lack of financial literacy skill/low saving behavior among the farmers have contributed to the declining number of bio-digesters through credit in 2019. Moreover, the prospective farmers were considered credit unworthy cannot access the biogas loans due to other outstanding loans. Therefore, these Micro Finance Institutions (MFIs) were providing non-commercial loan where support from IDBP is still needed whether through guarantee scheme or supporting the collection of debt repayment and subsidy. To support the implementation of credit-financed biodigesters from all CU partnerships, IDBP provided CU-funded mason training, demo plots and biogas capacity building. Consistent capacity building to the MFIs and risk mitigation strategies will need to be discussed regularly between the MFIs with IDBP.

Sustainability education to improve managerial skills, saving habit and financial literacy of the farmers would be the priority of IDBP LPO partners. In 2019, YRE has agreed with the RBF and INKOPDIT/CUCO to work together to improve the sustainable training-capacity of MFIs and potential user members. YRE and RBF is seeking cooperation in developing Knowledge Management tools that can be implemented to increase the management, accounting and administration skills for RBF partners and other prospective MFIs, as well. The capacity building efforts is expected to increase the MFIs capabilities, rate of biogas loans repayment and reduce Non-Performing Loan (NPL) risks. The provision of loan and saving package schemes for bio-digesters (credit program and commercial) will be carried out gradually.

In a broader scale, IDBP found out there was lack of policy supports from the government to provide incentives, such as: tax deductions, interest subsidy, revolving funds, etc. to the financial institutions to support biogas sector in 2019. In particular, the financial institutions have to bear their own portfolio risk to disburse their own funding. Those factors would lead the MFIs or commercial banks to become highly selective to channel more loans for the construction of bio-digesters. Therefore, IDBP is actively seeking cooperation with related ministries and commercial banks to provide working capital loans and biogas loans through the commercial and/or program/CSR schemes to the LPOs or CPOs. IDBP dan YRE saw the opportunity from the soft loan program of Revolving Fund Management Institute/LPDB of the Ministry of Cooperatives and SMEs that can be allocated in biogas credit schemes through cooperation with selected dairy/productive cooperatives. Meanwhile, IDBP still has to increase the capacity of its CPOs/RESCOs to become more creditworthy, as well. IDBP and YRE would continuously advocate GoI in providing incentives and facilities to the financial institutions involvement in the biogas sector. All of those efforts are expected to increase the demand for biogas loan in 2020 onwards.

4.3.3 Quality Regulations, Norms and Standards

A good quality of biogas installation is necessary in order to produce and maximize the production of cooking gas. Thus, IDBP and the government of Indonesia have established a regulation that stipulates on the SOP/procedure of building and operating biogas system. The SOP is registered as Indonesian National Standard (SNI. 7826 issued in 2012) which stipulates on the know-how of building and installing fixed dome biogas with the concrete material. This SOP is completed with another registered standard of SNI. 7927 issued in 2013 on the supporting appliances for biogas installation.

In order to strengthen the market penetration of 'BioMiru' model, IDBP works closely with *Badan Stardardisasi Nasional* (Indonesia National Standards Agency) for the development of new standard to acknowledge as well as to register the newly-introduced 2m3 PE model. The development of the standard and the registration of the model is very crucial as it would be very significant to accelerate the adoption of the model. In addition, the SNI registration-along with the requirements-will become a reference for Indonesian government in conducting the procurement of low-pressure biogas project. During this period, a series of activities had been conducted to initiate the work, including 1 (one) FGD in December 2019 involving MEMR and other related parties to start discussing on the draft development. IDBP aims for the SNI of BioMiru to be finalized by 2021.

In addition, under the collaborative work with DGNREEC-MEMR, IDBP has become a trusted partner for the technical aspect of biogas and has been involved

in a special task force developing many regulations related to biogas installation, i.e.: liquid waste biodigester type and high pressure biogas installation type. Recently, IDBP is working closely with MEMR and related stakeholders for the standardization of low pressure biogas installation.

4.3.4. Market Information

Towards Zero Waste with Biogas

Campaign for zero waste has been launched by the Deputy Governor of West Nusa Tenggara (NTB), Sitti Rohmi Djalilah, in responding to the growing concerns about the level of pollution in the region. This campaign gives a new hope for the people of NTB a simple and effective ways of waste management at home using biogas. To celebrate the 6th anniversary of IBRA (Ini Baru Banjar) community in the environmental protection in NTB, Yayasan Rumah Energi (YRE), in collaboration with IBRA, launched a mini home biogas (BioMIRU)in one of the Banjar Village resident's homes.

Picture 12. A Quality Inspector (QI) was explaining how to use BioMIRU

Educational Programs on Biogas Technology

Educational programs are defined as formal knowledge transfer in schools, colleges or courses for the general public and potential users. They create awareness about biogas technology which goes beyond of what is transmitted in PR campaigns. Since 2019, Rumah Energi initiated educational activities on the Domestic Biogas (BIRU) program to the public. The aim is to be able to provide the public with proper knowledge and platform that can improve technical expertise and entrepreneurship that drives the biogas market. In January 2019, 25 students from Al Jabr Islamic Junior High School Jakarta visited one of the biogas locations in Depok to give students an overview of how biogas works. The visit received positive responses from all student participants because it further informed about the domestic biogas technology as one of the solutions to climate change adaptation and mitigation.

Picture 13: Students from Al Jabr Islamic Junior High School get an explanation of biogas and practice how biogas works

As part of its community awareness activity, IDBP also conducted Biogas Goes to Campus. This activity is a collaboration between Rumah Energi and Budi Luhur University (UBL) in the construction of biogas plants and trainings to UBL students and academics. UBL is the first university in Jakarta to have built a biogas plant in developing power generation systems from renewable energy sources. It also created a research activity on the biogas technology for the students of the Electrical Engineering Study Program. Through the collaboration with universities, IDBP provides opportunities for students from any disciplines to work with real-world sustainability issues where their learnings help solve real problems by thinking critically and working together.

Picture 14: The workshop participants take a look into the biogas mixer

Media Promotion

BIRU is using social media platforms for wide engagement with the public that allow discussions, incorporate new ideas and foster learning. BIRU is running a website and Facebook to communicate the program with a wide-range of stakeholders, while YRE is using Instagram and Facebook to reach its audience for community awareness raising.

As one of the most important tools to communicate BIRU programme to the stakeholders, during 2019 BIRU website has been visited by 89,046 users which identified with 84% new visitor and 16% returning visitor. The average pages/session (1.46) and session duration (1 min 13 secs) indicates the visitors mostly landed on the homepage only. Thus, the optimization for the efficient information on the webpage is crucial to avoid the scattered and redundant information which can overwhelm the visitor.

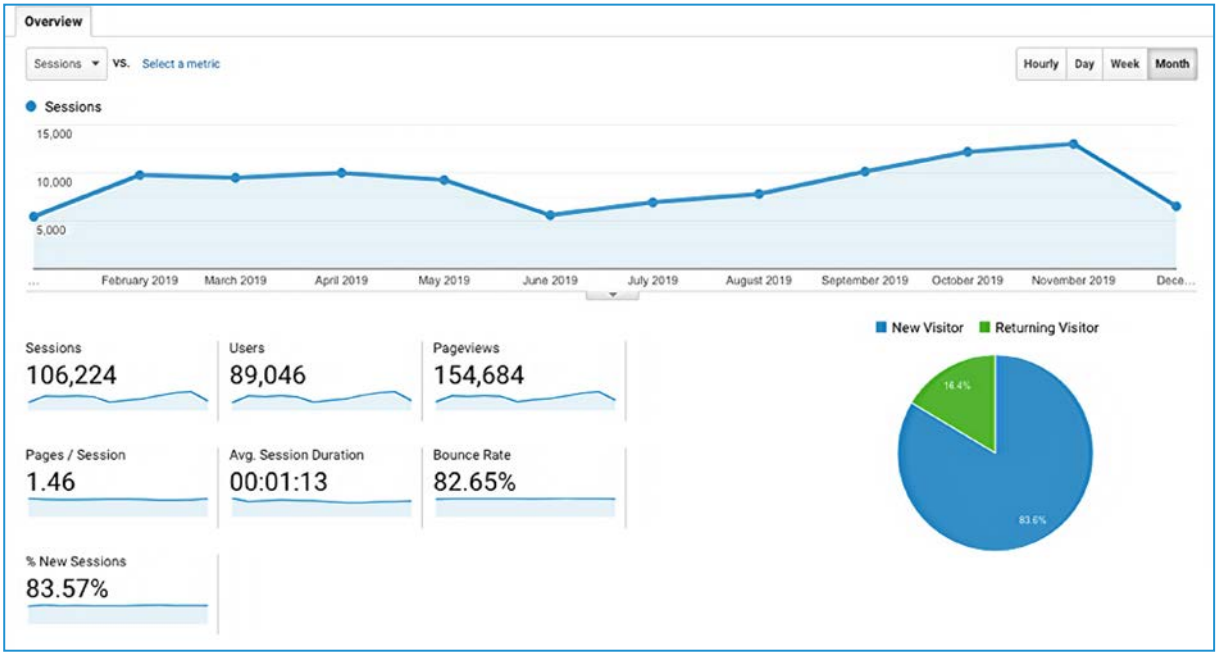


Chart 4. An overview of BIRU website traffic

As shown in picture 19, mobile phone is commonly used device in visiting BIRU homepage (73.5% of all devices). In addition, the channel mostly used to bring visitors to BIRU website is from the organic search. Thus, the SEO and SEM are important to maintain continously.

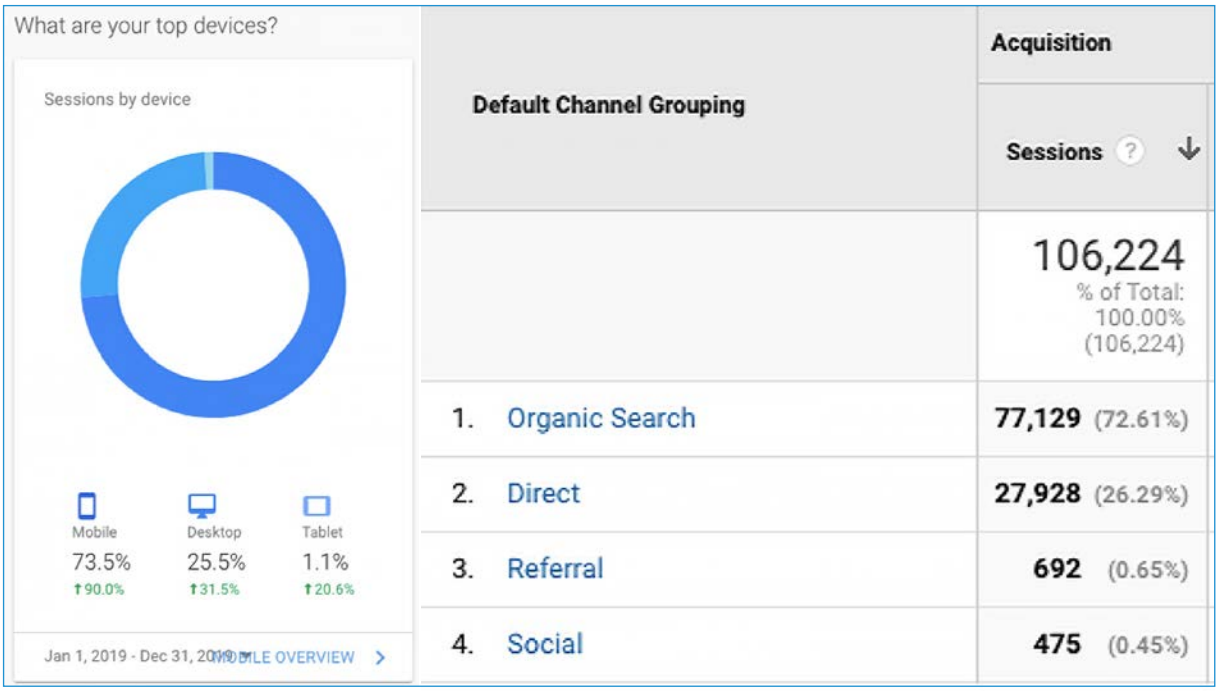


Chart 5. An overview of channel grouping

- **Instagram**

The number of followers of YRE Instagram platform (@rumahenergi) was growing slowly especially during January – August period. The average growth of follower on those periods was less than 50 new Instagram users each month. IDBP keeps tracts of the metrics to see the impact of the social media for biogas promotion as presented on the chart below. Reach is the total number of people who see YRE Instagram post or story on any given day, while impressions are the number of times the content is displayed, no matter if it was clicked or not.

The YRE Instagram has an average reach of around 5.000 people and an average impression around 17.000 people. As the impressions are higher than the reach, it's a sign that the audience viewed Instagram content multiple times. In September to December 2019, YRE carried out several events (online and offline activities) make some ads for several posts to gain new audience for campaign purpose. Subsequently, the number of followers augmented with around 150 – 200 new followers, an average reach of 13.000 people and an average impression of 70.000 people, which is an indicator of what's performing well.

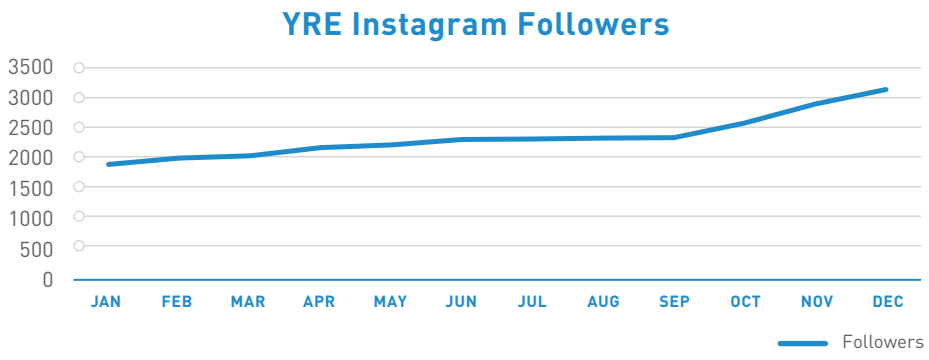


Chart 6. An overview of channel grouping

Overview January - December 2019 /

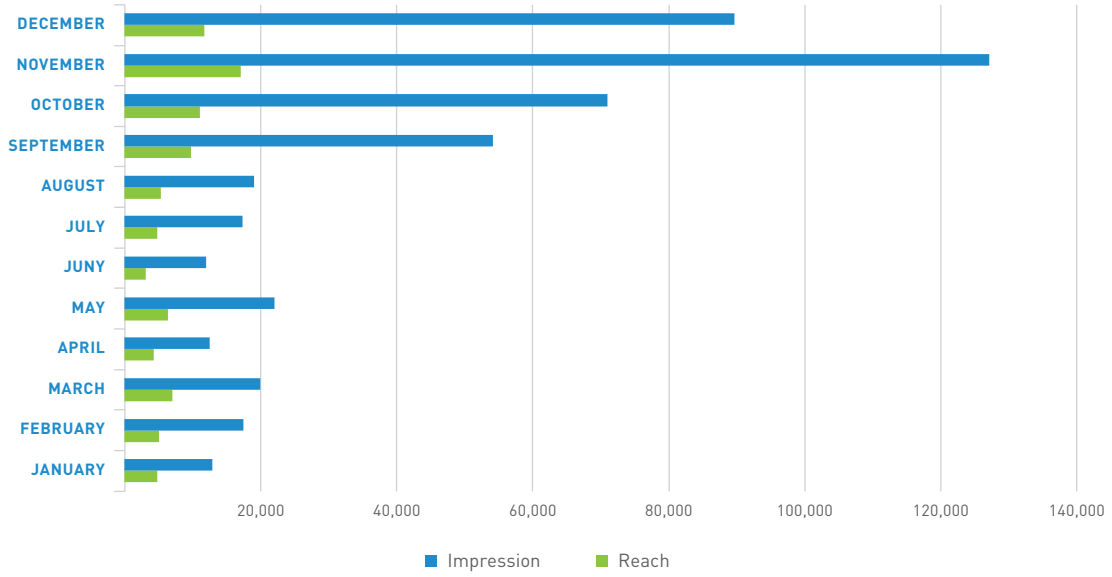


Chart 7. YRE Instagram's reach and impression

- **Facebook**

  IDBP has two Facebook Page (Rumah Energi Page & BIRU Page). Each page has unique audiences and different mode of interactions. IDBP elaborates those pages insight for a year, and the result we have the average of reach around 40.000 people per month and the average of engagement (including comments, direct message) around 5.000 people per month.

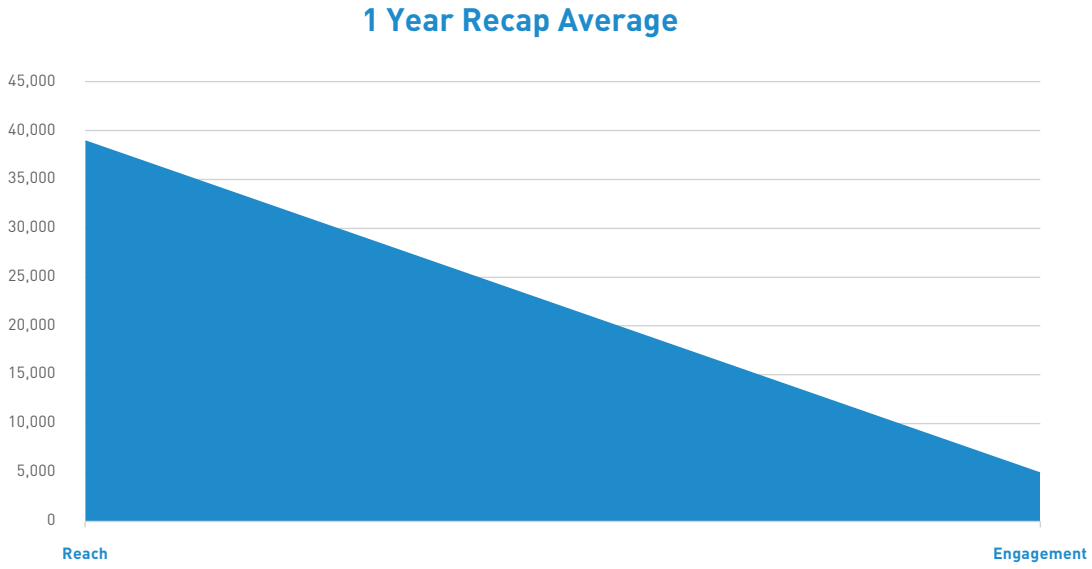


Chart 8. An overview of the reach and engagement of BIRU Facebook page

- YouTube

  IDBP's YouTube channel is going slowly growth due to several factors such as consistency of posts or content materials. During the period of 2019, the average views per month was around 2.600 views, 5.800 minutes of watch time, and 9500 impression. To increase number of audiences, YouTube contents will be connected to social media platforms to get more audiences.

Editorial Meeting

The media is the main promotional tool in endorsing biogas use. In November 2018, Rumah Energi, in collaboration with The Society of Indonesian Environmental Journalist, invited a range of online and offline media in editorial meeting to increase exposure of the program. The follow up of this meeting is the creation of Journalist Communication Forum on "Green Energy" to promote renewable energy, particularly domestic biogas, and advocate on government policies on clean and renewable energy.

As a follow up, a two-day journalist workshop on "Green Energy for The Future with Biogas" was organized by Rumah Energi in June 2019. Journalist from reputable online and offline media from different cities in Indonesia participated in the workshop that identified several action points, including:

1 To closely monitor the consistency of Indonesia government's policy in renewable energy
2. To educate consumers on the biogas applied technology
3. To establish a communication forum for media and other stakeholders to support the campaign on renewable energy

The workshop also recommended series of follow-up workshop to be conducted in provinces as part of biogas campaign activity *(List of publication provided in Annex 3. Media Publication)*

Credits: **Jin Panji**

STORY 4

ASEAN Energy Award

In 2019 YRE received an award from ASEAN ENERGY AWARD as the 2nd runner up, which was chosen as a non-profit institution that conducts renewable energy dissemination activities through biogas development that is integrated with the real concept of watershed conservation.

Raising the title "Preserving Watershed Areas (DAS) with Renewable Energy - Biogas", an innovative initiative, because it seems unthinkable that the concept of environmental conservation in watersheds can be comprehensively integrated with the development of renewable energy (et), especially with the use of biogas.

Yayasan Rumah Energi (YRE), in collaboration with Perum Jasa Tirta II (PJT - II), undertook a small initiative that had a major impact on the health and welfare of the community directly for communities in the Watershed (DAS) and indirectly for communities that far from the river flow. YRE, together with PJT - II, is trying to reduce waste pollution in the watershed, which is identified as livestock waste that has contributed to water pollution in the upper reaches of the Citarum River located in the Pangalengan area, Bandung, West Java.

The main issue raised is about the need for clean water which is the main need for all living things, even more so for daily consumption needs, at least 2 liters of drinking water needed by humans every day, assuming 1 family consisting of 4 members families will need 8 liters of clean water to drink every day, or 240 liters of drinking water per month, or 2,880 liters per year for just one family, so with a population of 2 million people in Indonesia, at least 2.880 million liters of drinking water are needed water per year, or the equivalent of approximately 151,578,947 bottles of 19 liters (commonly called gallons) mineral water.

Departing from this thought, then a question arises as to where the raw material for drinking water is, one of which is taken from the river water that we know is that almost all watersheds have been contaminated by wastes, both households. , factories and livestock waste that are directly or indirectly in the area near the watershed. The clean water quality standard itself according to RI Health Regulation No. 416 / MENKES / PER / IX / 1990, one of which is odorless, and tasteless.

In general, YRE together with PJT - II tried to process cow manure waste so that it would no longer be discharged into the watershed, but the manure was used as raw material for biogas production which could be utilized for daily household cooking activities, and besides the benefits of biogas pulp is as fertilizer, and a breeding medium for worms that has a high selling value. Reducing the level of river water pollution, by utilizing organic waste from cattle for processing into biogas production raw materials whose energy can be used for daily household cooking activities, and the biogas pulp can be used as fertilizer, and the media for breeding worms that have high selling value.

05.
Biogas User Survey (BUS) 2019

The Biogas User Survey (BUS) is an important instrument to measure the satisfaction rates of users towards biogas, to check the technical performance of the digesters and to use the result as the source of carbon monitoring of IDBP. In 2019, IDBP conducted BUS with samples consist of users with 10 cluster year of bio-digester use from 9 provinces in Indonesia (West Java, Central Java, D.I. Yogyakarta, East Java, Lampung, South Sulawesi, Bali, West Nusa Tenggara and East Nusa Tenggara), based on methodology settled by Gold Standard. The field survey is conducted by Jakarta Research Institute (JRI Research) toward 278 of biogas user households who are still using biogas from VPA 2 (users of biogas from January 2017 to June 2019) and VPA 1 (users of biogas from July 2009 to December 2016) with the following sample distribution:

	Year of Usage	Completion date of biogas plant construction	Total completed interview
VPA 2	Year – 1	July 2018 – June 2019	33
	Year – 2	July 2017 – June 2018	30
	Year – 3	Jan 2017 – June 2017	28
VPA 1	Year – 4	July 2015 – June 2016	24
	Year – 5	July 2014 – June 2015	28
	Year – 6	July 2013 – June 2014	30
	Year – 7	July 2012 – June 2013	24
	Year – 8	July 2011 – June 2012	30
	Year – 9	July 2010 – June 2011	27
	Year – 10	July 2009 – June 2010	24
	Total Households		278

Table 8. Distribution of BUS samples by year

The result of BUS gives the Program management and stakeholders, including the users, insights in the reliability and success of the biogas sector development approach as it is aimed on sustainable use of the biogas technology as introduced by the Program. The result of BUS described as follows:

a. User Satisfaction

The result of BUS 2019 shows that almost all households (88%) are satisfied with their biogas plant, in terms of the quality of appliances, and the services or help provided by CPO

b. Motivation of User – build bio digester

The most prominent motivating factor for having bio-digester was to reduce household expenditures (90% samples). The next driving factors for having bio-digester are use of bio-slurry, subsidy provided, less effort to have energy and reduction in firewood collection.

	TOTAL	VPA-2	VPA-1
BASE: Total respondents of 1-4 year of use	**115**	**91**	**24**
Reduction in household expenditures (oil fuel, fertilizer, etc)	90%	93%	79%
Use of bio-slurry as fertilizer	43%	38%	58%
Subsidy provided	37%	36%	38%

	TOTAL	VPA-2	VPA-1
Less effort to have energy	34%	35%	29%
Reduction in firewood collection	31%	32%	29%
More safety	30%	30%	33%
Improve hygiene of barn	24%	27%	13%
Faster cooking	22%	25%	8%
Reliable energy supply	22%	23%	17%
Smokeless kitchen	7%	8%	4%
Because it can be paid in credit scheme	2%	2%	-
To reduce environmental pollution	1%	-	4%

Table 9. Motivation for installing bio-dogester

In regards to motivation to own biogas plant, the survey only targeted to the users of Year-1 up to Year-4 of usage (115 households). This question is no longer asked to the old users.

c. Benefit of Bio-digester

Most of respondents said that biogas plant brings various benefits, including the reduction in household expenditure is considered as the most important benefit for most of households (61%); and no difference among VPA-2 users and VPA-1 users. Meanwhile the other 14% households consider the safety aspect of biogas energy as the most important benefit in having biogas plant; and found more among VPA-1 users than VPA-2 users (19% vs. 5%).

	Total	VPA 2	VPA 1
BASE: Total HH	**278**	**91**	**187**
Reduction in household expenditures (oil fuel, fertilizer, etc)	61%	60%	61%
More safety	14%	5%	19%
Reduction in firewood collection	5%	4%	5%
Faster cooking	4%	5%	4%
Use of bio-slurry as fertilizer	4%	5%	4%
Less effort to have energy	4%	4%	4%
Reliable energy supply	3%	4%	2%
Improve hygiene of barn	1%	3%	1%
Subsidy provided	1%	4%	-
Smokeless kitchen	1%	2%	-
Can be used for animal feed	0.4%	-	1%

Table 10. Benefits of biogas digesters

d. Benefit received, in relation with gender equality

Energy poverty strongly affects the individual's living and social conditions and undermines educational and business opportunities. In this survey, almost half or females and males said they have more spare time to take care of their family after having biogas. They also can use their free time for chatting or getting around with neighbors, and to do other social activities and income generating activity. Those who have the interest in using their spare time on education-related activities (course, accompanying the kids when studying) is relatively low. Only 20% of females and 16% of males have interest to spend their time on educational activities. Further details can be seen in the following table.

Biogas User Survey (BUS) 2019

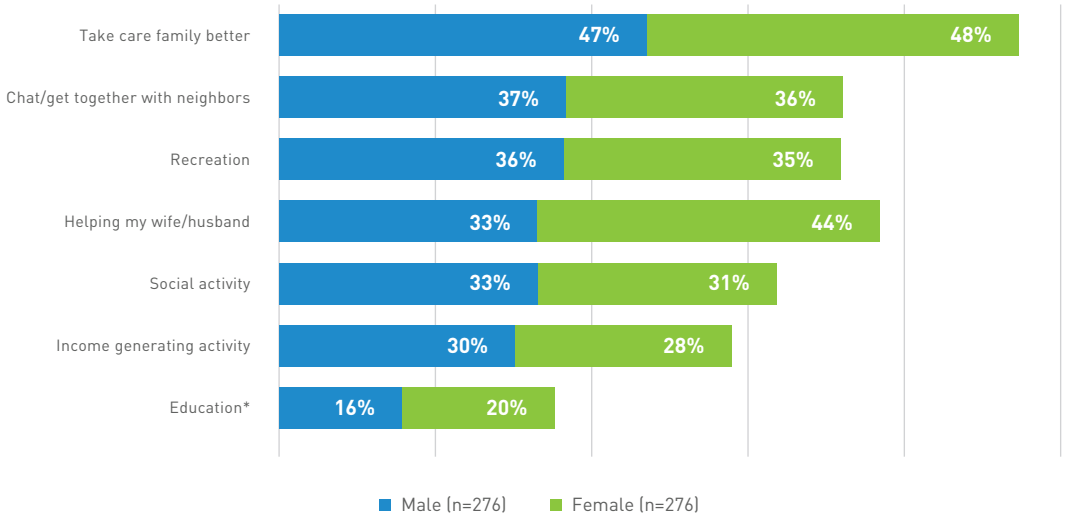


Chart 9. Utilization of spare time derived from installation of bio-digester

Based on the BUS findings, biogas digester is considered more beneficial for females than for males (85% vs. 10%). Females users in these areas are typically responsible for household's energy supply. The largest advantage of biogas for them is they can cut energy cost for cooking purpose. Since the savings are generally managed by females, it will bring more space of financial independency for them. Meanwhile for the males, ownership biogas digester significantly reduces their workload in collecting firewood; yet, on the other hand, increase their workload for mixing dung and water for digester plant feeding.

e. Impact of bio-slurry on agriculture production

Bio-slurry resulting as a waste from dung anaerobic process inside the reactor for producing biogas is a very good organic fertilizer. It has been proven that the use of bio-slurry for fertilizer can increase the harvest results. Regarding the use of bio slurry as fertilizer, apparently, the most noticeable impacts toward their plants are:

- The soil more loose and fertile (88%)
- Quality of their harvest results better (83%)

A better harvest will increase own consumption, increase income or both. Bio-slurry can also be used to sell to other farmers, i.e. as a trading commodity, but only 3% from total 278 households use bio-slurry as their additional income source by selling it.

f. Impact on energy, emission reduction and environment

The biogas program is not only to support biogas users about environment friendly management of livestock waste, but also to reduce the use of fossil fuels and firewood, avoid greenhouse gas emission, deforestation and global warming.

The BUS survey found that the biogas program has not been able to have a maximum impact in reducing the use of fossil fuels and firewood. Although 77% of households say that the gas produced can meet the domestic energy needs; but this must be interpreted as merely to reduce the energy costs that they have to spend on cooking. Most of biogas users in the survey still use firewood and LPG (57% and 65%, respectively). In other words, the majority of biogas users reduced their fuel consumption and/or expenditures, while biogas only covers part of their cooking fuel needs. The high availability of LPG with its affordable price has contributed to the persistent use of this fossil fuel in fulfilling household energy needs which in consequent could be a threat to the success of biogas program in reducing emissions maximally.

In 2019, IDBP has simultaneously conducted BUS, KPT and Leakage Test activity. KPT or Kitchen Performance Test is the activity to collect the information of an efficiency level between biogas fuel and non-biogas fuel, while the Leakage Test is

Biogas User Survey (BUS) 2019

the activity to collect the information of non-biogas fuel usage of non-biogas user. IDBP conducts KPT and Leakage Test once every 2 years.

KPT is the principal field–based procedure to measure household fuel consumption. The primary objective of the KPT is to quantify fuel consumption under typical household and stove usage conditions. The last KPT was executed across all 9 provinces: Bali, West Java, Central Java, East Java, Yogyakarta, Lampung, West Nusa Tenggara, East Nusa Tenggara and South Sulawesi. The result of the KPT Survey shows the use of biogas is reducing the consumption of firewood and LPG for cooking. The average household consumption of firewood and LPG for cooking in a day among biogas users is significantly lower than for non-biogas users.

Credits: *Jin Panji*

06. Geotagging Activity

Since the inception of IDBP in 2009, the program is supposed to check the quality of at least 27% of the biodigester built under the program. This goal was set in the first proposal of IDBP as advised by SNV (which had done the feasibility study for this project in 2008). In addition, since 2012, it is considered important that the spatial coordinates of each digester is registered to ensure that anybody can find the digester easily based on the GPS coordinates to enable easy verification of the existence of any digester in the database. Current technology allows the collection of these coordinates at an affordable price by using GPS equipment or a smartphone with the right software installed. Each digester constructed must be recorded into the database; a robust database system was developed which is routinely updated by collecting and processing data on new digesters (intake, household agreements and completion reports), user training information, Quality Inspection visits and After Sales Services (ASS); which allows IDBP to monitor the performance of the digester during warranty time, and for easier-tracking in case any issue occurs.

Preparation for geotagging activity began in May-June 2018. This activity involved several external surveyors under the coordination of Provincial Coordinators and Quality Inspectors as the personnel-in-charge in each province. The external surveyors are contracted by IDBP specifically selected with the capability to utilize an online platform called KOBO Toolbox. From the total of 23,500 units constructed until June 2018, 16,653 biodigesters were targeted for this activity. The number comes from biodigester that constructed from 2009 until June 2017 which do not have GPS coordinates. In total, the actual numbers of successfully tagged digesters are 16,994 units. The result exceeded the target because it was simultaneously decided to visit the digesters built during the period of July-December 2017 which located nearby the targeted digesters for efficiency purpose.

Province	# of visited digester
Bali	1093
Banten	14
West Java	1238
D.I. Yogyakarta	953
Central Java	977
East Java	7533
Lampung	68
NTB	3140
NTT	784
South Sulawesi	1194
Total	16994

Table 11. Number of bio-digesters visited for Geotagging activity

Picture 15. Location of Geotagging activity

Geotagging Activity

Due to efficiency, IDBP has decided to have additional activities to enhance the quality and delivery of the program. Thus, the objective of this activity is not only to have the GIS coordinates of constructed digesters, but also to have the operational status of built digesters.

The expected outputs from this activity were defined as:
a. The GIS coordinates of each digester
b. The operational status of the digester
c. Quality inspection and after-sales service
d. The utilization of bio-slurry by the user

From the total number of 16,994 units visited, it is found that 6,543 units (or 38% from total units inspected) are not functioning. The details of the non-functioning digesters in each Province, as shown in below chart:

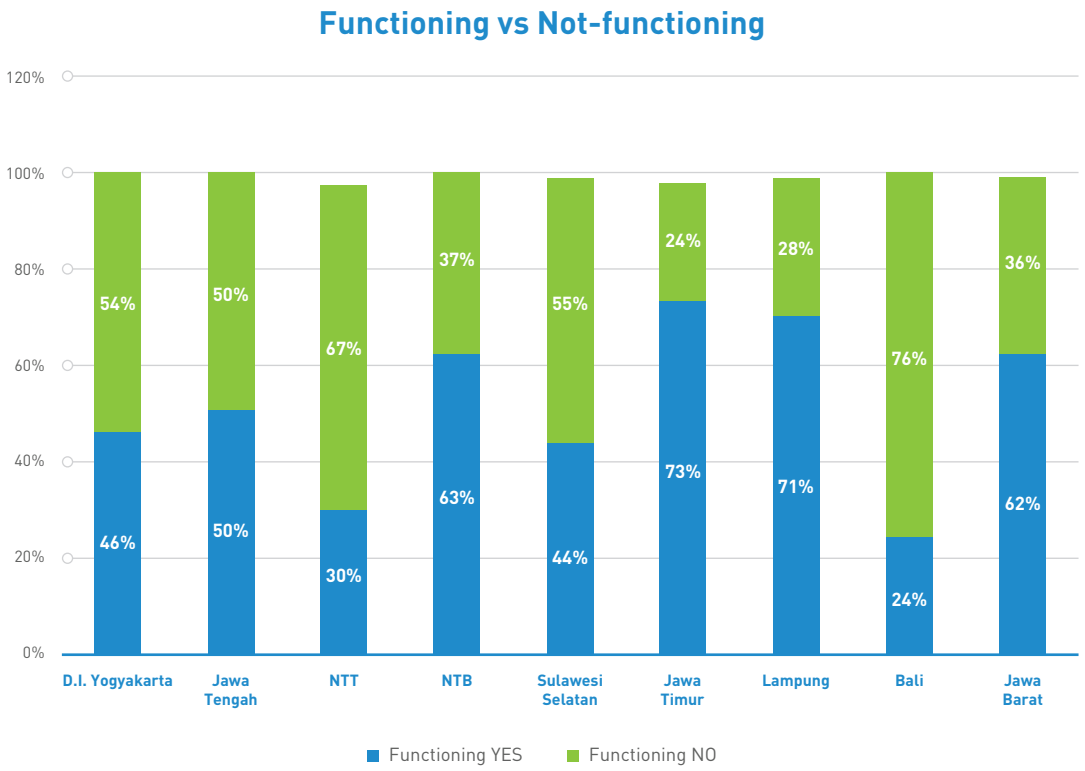


Chart 10. Percentage of functioning vs. non-functioning digesters

The issues for the non-functioning digesters vary as follows:

Technical Issues	
Lightly damaged	piping issues, broken stoves, leaking on water drain, broken gas tap, broken mixer, etc.
Moderately damaged	cracking in inlet and outlet
Heavily damaged	cracking dome
Non-Technical Issues	
To be handled immediately	users no longer want to operate the digester
	manure is stacked in the overflow, yet the user is not willing to operate the digester
Cannot be handled immediately	users no longer have cattle/cattle are sold
	the user has moved to other place/have passed away

Geotagging Activity

The finding of geotagging activity outlines the prominent non-technical issue is the lack of attention paid to feeding the digesters as presented below:

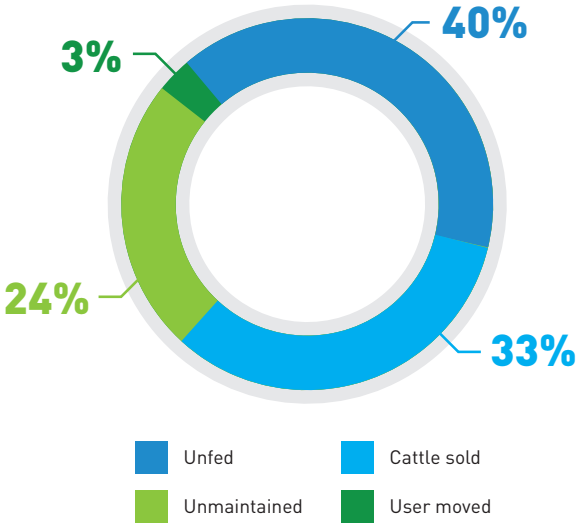


Chart 11. Non-technical issues contribute to the failed biogas digester

In ensuring the full functioning of installed bio-digesters, IDBP gives considerable efforts for revitalizing broken digesters with light damages by working in collaboration with qualified CPOs. This is part of ASS mechanism built within IDBP to ensure long-term use of bio-digester. This effort, however, needs to be supported by the good-will of the users as well as ensuring them to continuously use the digester after revitalization.

For non-functioning bio-digester due to non-technical problem, IDBP would seek for:

1. Develop mutual commitment with the user documented in a form of written agreement for re-functioning of the bio-digester either by re-owning the livestock or obtaining cattle dung from the neighbors;
2. IDBP will support the users who do not have livestock or those who have trouble finding animal waste by providing training on producing artificial feedstock in order to ensure the continuous utilization of the bio-digester.

The sustainability of bio-digester utilization by the user is very important. Onwards, IDBP, in coordination with Hivos, plans to continue the revitalization activities for the digesters that categorized as moderately and heavily damaged.

Credits: ***Jin Panji***

07. Bio-slurry Value Creation

One of the outputs of a biodigester, next to the biogas, is bio-slurry. This is the effluent of the organic matter remaining after the anaerobic digestion process that can be used as good organic fertilizer for crops. The result of Biogas User Survey (BUS) in recent years found that users are willing to have bio-digesters not only for access to clean cooking but also for the bio-slurry. Indeed, bio-slurry is an excellent "instant" fertilizer which has same quality of composted cow dung that needs longer process to be available.

For commercial value, IDBP has formulated and certified the bio-slurry fertilizer. Organic certification alone is not sufficient for bio-slurry fertilizer to be commercialized. It still needs the selling permit from Indonesian Ministry of Agriculture. In 2019, YRE tried to apply for a bio-slurry selling permit from the Ministry of Agriculture and the Ministry of Cooperatives. However, the cost of obtaining a fertilizer distribution permit turned out to be an obstacle. Then the strategy was changed by encouraging institutions / groups that have fertilizer sales businesses to register these business licenses. YRE will help facilitate the relations institution/group to the respective Ministries to obtain selling permit.

The utilization of bio-slurry by the users was also identified within Geotagging activity as presented in the chart below. The bio-slurry are used for various purpose, i.e.: fertilizer, compost, cattle feed, fish feed, and vermicompost.

Picture 16. A biogas user is using liquid bio-slurry for his agriculture

Bio-slurry Value Creation

The percentage of bio-slurry utilization in each province as shown in below figure:

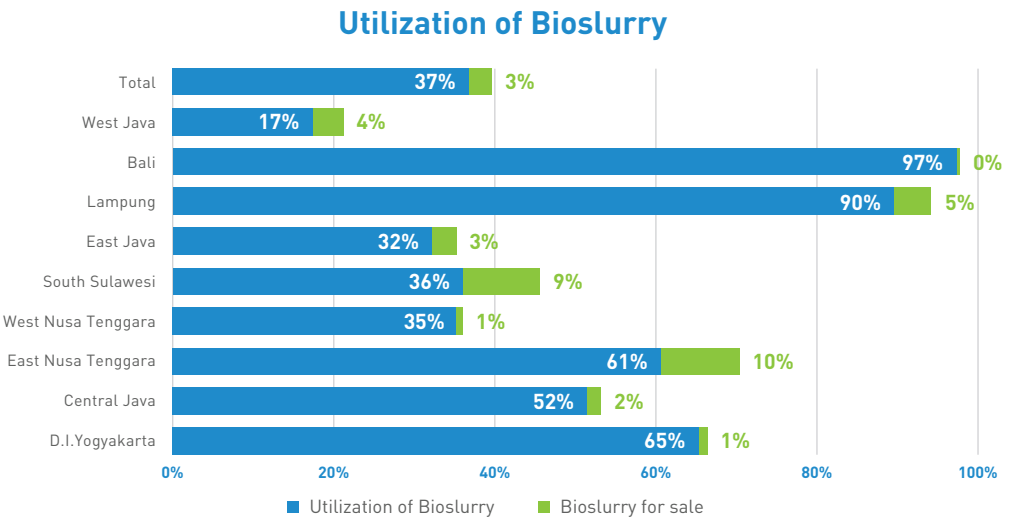


Chart 12. Utilization of Bio-slurry

The table shows the biogas users have applied bio-slurry into their agricultural practices. By doing so, they reduce expenditure and utilizations of chemical fertilizer. The challenge of this indicator is users' willingness and behavioral change in bio-slurry application into their agriculture routine although training and knowledge on benefit of bio-slurry application (i.e. reducing cost and income generation opportunity) have been given. A reason of not applying bio-slurry that is often brought up by biogas users is the far distance between biogas location and their land. In short, they need more effort to bring bio-slurry to their agricultural land.

To overcome this challenge, a campaign and information dissemination that promote bio-slurry utilization and its benefits namely as soil conditioner, savings from purchasing chemical fertilizers and potential market for bioslurry business is a must.

Picture 17. Bio-slurry products distributed by YRE in collaboration with Livestock Group in Pengalengan, West Java

Bio-slurry Value Creation

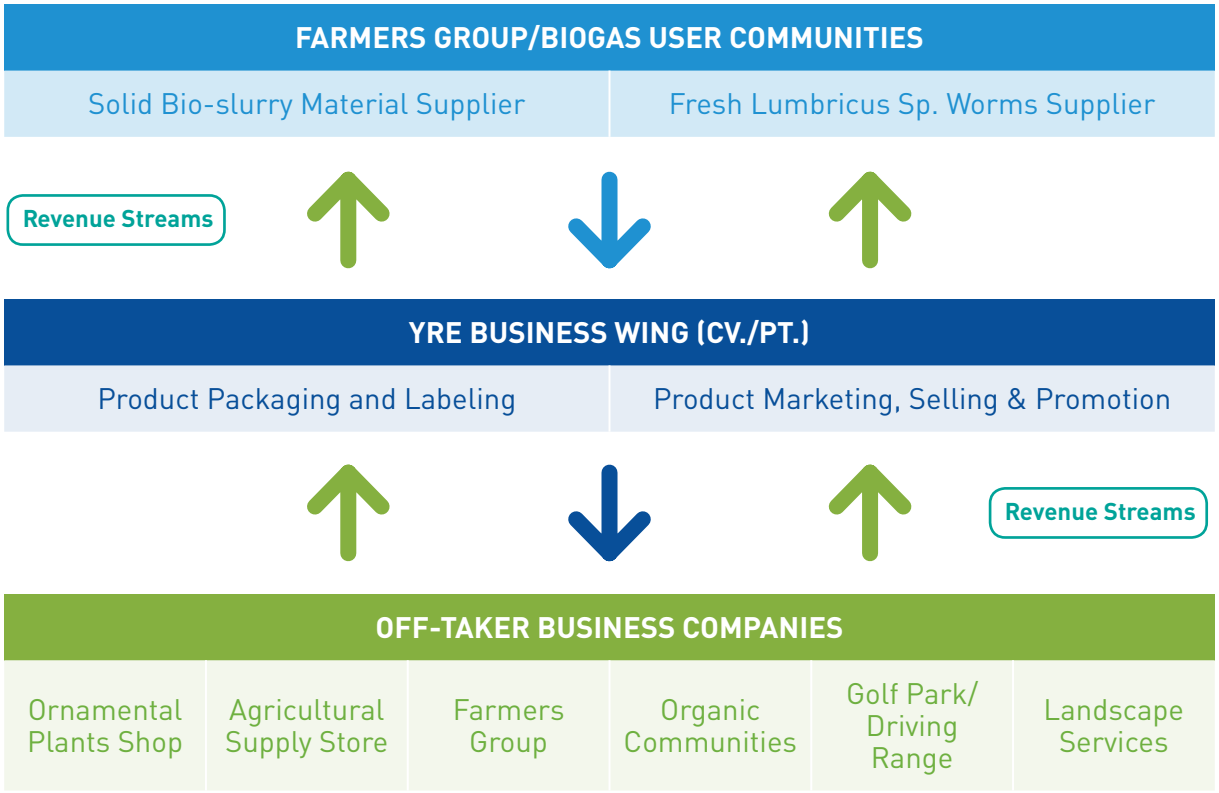
Since 2012, IDBP has developed bio-slurry business model to find the most suitable and efficient business strategy that can be applied by users and private sectors. However, the business model implemented by IDBP partners has yet proven to be commercially viable and sustainable. One of identifiable factors is that they were highly dependent on program funding. In 2017-2018, a business model was designed with YRE acted as an intermediary or third party in distributing bio-slurry products to end-users. Also, this model must be tested for its commercial feasibility, including its potential in providing passive incomes to YRE.

In 2017, IDBP developed a "Tirta Mukti Energi" community in Pangalengan, West Java province through a partnership with CSR program of PT. Perum Jasa Tirta II. This community aims to develop fertilizer and fresh worm businesses for dairy farmers in the upper reaches of the Citarum river. Instead of disposing cow dung into the river, the biogas digester allows the farmers to convert animal waste into fertilizers that generate additional income.

In 2019, YRE conducted a Feasibility Study to develop a business plan for the marketing of packaged fresh worm commercial businesses and three types of organic fertilizers:

1) Vermicompost that becomes premium product.
2) Beta, which consists of solid bio-slurry mixed with chicken dung, and
3) Promaks which is a mixture of manure from cow manure and chicken manure.

The study found that commercial business of organic fertilizer and fresh worms in medium and large scale through new business wing institution require high initial investment and high initial operational cost. Therefore, YRE has decided to postpone the implementation of aforementioned business plan. As an alternative, YRE is developing a small-scale market for packaged-organic fertilizers for souvenirs and to use social media for the product marketing. YRE would further develop this opportunity for the institution's passive income whilst welcoming collaboration with interested parties to play a role in developing the bio-slurry potential in commercial scale.



Picture18. Bio-slurry business model proposed by YRE

Credits: **Jin Panji**

08. Gold Standard Carbon Certification

IDBP has been registered as a Voluntary Gold Standard Program of Activities in 2013. Gold Standard is a well-respected international carbon standard registration and verification agency that has a reputation for facilitating a carbon finance system for voluntary emission reduction and the sustainability of projects in developing countries. While GS Program of Activities (PoA) is designed for different activities in the biogas sector, IDBP focuses on the use of biogas for cooking as a renewable energy project for replacing wood and LPG. Based on Monitoring Report period 2, VPA 2 Indonesia Domestic Biogas Program which has been approved by Gold Standard, annual emission reduction from 1 bio-digester unit is 2.48 tCO2e.

Verification means a project and its design have been assessed by an independent third party. Registration means the project has been registered in a database or as a certified standard, like Gold Standard *(see https://registry.goldstandard.org/projects/details/1619).*

Obtaining carbon credits is made possible under strict standards and regulations, including the obligatory of annual monitoring of the project, emission audits and Kitchen Performance Test surveys. Hivos routinely undertakes these obligations making use of external agencies.

Since the start of the registration in 2013 Hivos has received EUR 1,614,979 of carbon credits (in 2019 the amount was EUR 276,337). The funds are pumped back into biogas activities and form an important part of the co-financing provided for the EnDev funds to implement the BIRU program. The majority of the funds is used to provide investment incentives to the farmers, while a minor part is used for the carbon sales activities, for monitoring, audits, consulting and various surveys (such as Biogas User Survey and Kitchen Performance Tests) and for various project costs that are not covered by EnDev or other donors.

STORY 5

Stakeholders' Meeting: Monitoring and Utilization of Carbon Credit Mechanisms to support the Development of Indonesia Domestic Biogas Program (IDBP)

Jakarta, 17th October 2019

IDBP Program was registered under Voluntary Gold Standard Program of Activities in 2013. Through the Gold Standard, it is noted that one digester apparently reduces 2,48 tonnes of carbon emissions which is converted into cash that will go back into the program. Hivos in Indonesia and elsewhere will be able to use this capital in a legitimate way for implementing program development. Since the IDBP Voluntary Gold Standard Program is active, Hivos as the coordinating and program management agency, has received a number of Verified Emission Reductions that have been mobilized for the implementation of IDBP Program.

The stakeholder meeting aimed for knowledge sharing and dissemination of information to relevant stakeholders in the domestic biogas sector in regards to the monitoring mechanism and the transparent and accountable utilization of Verified Emission Reductions (VERs) under the framework of IDBP Program development. The meeting was attended by 43 participants from the government, NGOs, and private sectors. This stakeholder meeting highlights the efforts of each agency and also serve to illustrate how government and private agencies are collaborating to expand the biogas industry and reduce GHG emissions.

09. Challenges & Lesson Learned

9.1. Challenges

User's low ability to pay

Considering the increasing cost for fixed dome model mainly the increasing material costs, potential users who have the interest in biogas face a great challenge in financing for the installation. On average, the potential user's ability to pay ranges between IDR 2 million to ID 5 million. One mitigation measure is to find new LPOs where the potential users are located to be IDBP partners to provide biogas loans. In the case where there is no LPO working in the area, then the RESCO will be trained to be able to carry out fundraising from local funding source (i.e: CSR). However, the challenge is to find companies who have aligned programs in biogas or energy access.

Limited network of CPOs

Since most IDBP areas have been relying heavily on National and Local Government funding whether through DAK or Local Budget (APBD), CPOs have also been relying on Local Government funding and procurement. The impact that we observe is that CPOs have difficulties in closing the financing gap for their biogas. The next mitigation plan is to train RESCO to be able to raise fund from CSRs and build new networks.

Changing political landscape and support to biogas program

Changing of Governor in South Sulawesi has impacted the program where the support for biogas in the province is quite challenging including the budget allocation. However, efforts on approaching the new government officials sitting in Bappeda and Energy Office are carried out continuously. Furthermore, the functionality of the units has been an issue that needs to be resolved to answer any doubts regarding the effectiveness of biogas. Hence, data support under the Management information System (MIS) produced by the YRE team will be used for advocacy purpose.

To overcome the challenges, a range of capacity building activities was provided to YRE NBPSO and PBPO during the period of July to December 2019 that cover three main topics: (i) Fundraising training; (ii) Policy research and advocacy training; (iii) Strategic thinking and pitching training. Through the trainings, the IDBP team was equipped with strong advocacy materials to be presented to policy makers and the public and a strategic thinking to increase their capacity in pitching its programs to key decision maker. The training also taught the YRE team to be able to adapt to recent development, trends and innovations in fundraising.

9.2. Lessons Learned

Dilemma of IDBP extra subsidy in biogas financing scheme

The investment costs as well as the financial incentives such as subsidy and accessible credit schemes play a vital role in motivating a potential farmer to install bio-digesters. Nevertheless, this program found that extra subsidies issued by IDBP third party organizations, such as; Nestle or Government to support prospective users to access biodigester constructions did not guarantee the sustainability factor of digesters long term usage. A high percentage of installed biodigester units that are non-functional hinders community's trust on biogas and government's buy in. In some provinces, the extra subsidies policy from the government has reduced the willingness of potentials users to pay for bio-digester as they would prefer to wait for free units from the Government procurement. Hence, IDBP would need to coordinate with CPOs, LPOs and Government to determine the category of potential users who are entitled to receive IDBP extra subsidies. Through thorough planning on user profile and location that fit the profile of biogas users would help reduce the functionality issues and increase the accountability of the IDBP's performance.

The program recognizes the importance of suitable financing scheme for the domestic biogas up-scaling. Extra subsidies, particularly from government funds, can be channeled through direct deduction of bio-

Credits: **Jin Panji**

digester construction cost or by reducing the collateral value borne by potential biogas users. In the future, this type of intervention can replace IDBP subsidy to maintain the market price by providing an affordable bio-digester cost and by increasing access to credit facilities for potential biogas users. The government supports also can be channeled as revolving funds for soft loan to increase working capital for cooperative/ MFIs. In this way, the LPOs can develop special saving or credit schemes for biogas development which give mutual benefit, both for cooperatives and biogas users. This system is expected to increase user ownership and support long term usage of installed biogas.

10. Way Forward

Having been relying heavily on Central and Local Government budget for construction of new biodigesters, with an absence of Special Allocation Fund (DAK) since 2017, construction of new biodigesters have slowed down. As a result, IDBP and CPOs are constantly seeking to find new sources of funding both from donor's grants, corporate's CSRs, Village Fund, facilitating micro loans and exploring co-financing models to reduce the cost of the biodigesters for users in replacement of the DAK. In reducing the cost increase per unit, YRE is undergoing a series of trials to reduce the cost per unit of biodigesters through several demo plots. Furthermore, promotions activities will be intensively carried by the IDBP through online and offline events and channels to attract more stakeholders (e.g.: local government, corporations, NGOs, community groups) for awareness campaign and also to build collaborations in expanding the market. There are several other measures that the IDBP partners will be seeking as follows:

1. Intensive promotion to local governments, universities, corporations, community groups and individuals as potential biogas partners for awareness raising and campaign, joint funding and research and development;
2. Increasing program exposure to micro finance institutions in the 5 (five) provinces to provide and increase biogas loan portfolio by way of providing technical knowledge, promotion materials and best practices for the micro finance institutions;
3. Improve and raising awareness among the biogas users in utilizing bioslurry as economic product to generate additional revenue. This includes conducting online promotion to general public on the benefits of bioslurry, how and where to access bioslurry product;
4. Liaising intensively through FGDs and continuous coordination with other relevant Ministries such as Ministry of Agriculture, Ministry of Village and Disadvantage Region, Ministry of Cooperatives and SMEs, local governments regarding biogas program to include data provision, planning assistance, technical support, promotion materials, etc.;
5. Carry out an updated 2020 market feasibility study to narrow down market segments for fixed dome and biomiru models; technology efficiency; the use of Internet of Things (IoT) and exploring options for new business models for IDBP.
6. Continue the advocacy effort to reduce dependency on imported LPG with the hope that with decreasing number of imported LPG the demand for bio-digester will grow.

Credits: ***Jin Panji***

Annex

Annex 1: IDBP Office addresses

BIRU OFFICE			
No	**Province**	**Address**	**Contacts**
1	Jakarta	Jl. Pejaten Barat No. 30 A Jakarta 12550	Ph. : +62 21 7821090, +62 21 7821086 Fax : +62 21 7804443
2	West Java	Perum Panorama B1 Cinanjung, Tanjungsari Sumedang Jawa Barat	
3	Central Java	Jl. Diponegoro no 17 RT 005 RW 009 Karang Anom Klaten Utara 57437, Jawa Tengah	Ph. / Fax : +62272-325968
4	East Java	Jl. Klampok Kasri 2F No. 39 Malang 65115	
6	West Nusa Tenggara & Bali	Graha Permata Kota Blok CA No. 72 Selagalas, Mataram, Nusa Tenggara Barat	Ph / Fax : -
7	South Sulawesi	Jl. Todopuli Raya Timur Kompleks Villa Surya Mas Blok E/03 Kel. Borong Kec. Manggala Kota Makassar - SULAWESI SELATAN	Ph / Fax : +62 411 831044
8	Lampung	Perumahan Griya Kencana Blok B8 Jl. Raden Gunawan II, Kelurahan Rajabasa Pemuka Kecamatan Rajabasa, Bandar Lampung	Ph : +62-721 8012903 +62-81218120545
9	Sumba	Jln Palapa no 31, Matawai Kecamatan Kota Waingapu - Kabupaten Sumba Timur, Nusa Tenggara Timur	Ph / Fax : 0387 61865 0387 61865

Annex 2: Construction Partner Organization

Business Type	No.	Address	Biodigester Construction			
			2016	2017	2018	2019
Small Medium Enterprise	1	CV. Bina Energi Mandiri Persada (Central Java)	40	74	NA	NA
	2	CV. Qaryah Thayyibah (Central Java)	14	4	NA	NA
	3	CV. H&B PUTRA MANDIRI	26	6	1	NA
	4	CV. Karsa Tekad Mandiri	13	22	6	4
	5	CV. Fitria Jaya Abadi	3	9	NA	NA
	6	CV. Nur Indah Karya	49	34	10	17
	7	CV. PRATAMA BUTITI JAYA	96	8	NA	NA
	8	CV. Mega Mulya	59	1	NA	NA
	9	CV. Rezky Utama Masagena	24	135	68	80

Business Type	No.	Address	Biodigester Construction			
			2016	2017	2018	2019
Small Medium Enterprise	10	CV. Rehan Putra Palbon	45	2	1	0
	11	CV. Ritma Green Sinergy	197	23	13	13
	12	CV. Mitra Artha Utama	3	NA	NA	NA
	13	CV. Mitra Bumi Abadi	62	40	23	22
	14	CV. Palapa Abadi	211	44	101	0
	15	Dewata Mason Group (Bali)	18	76	6	0
	16	Abadi Mason Group	0	NA	NA	NA
	17	Boyolali Mason Group	1	NA	NA	NA
	18	Persada Mason Group	0	6	NA	NA
	19	Langit Biru Mason Group	38	19	1	NA
	20	Sumber Makmur Mason Group	0	NA	NA	NA
	21	Harapan Bersama Mason Group	25	8	7	NA
	22	Regol Mason Group	66	4	NA	42
	23	Sangkareang Mason Group (NTB)	188	71	121	51
	24	Paroso Mason Group	81	42	9	NA
	25	Mitra Sarana Kuba Mason Group	109	37	24	1
	26	Manjadda Mason Group	153	14	50	0
	27	Mabarakka Mason Group	13	0	13	0
	28	Tanjung Sari mason Group	68	13	NA	NA
	29	Mandiri Mason Group	88	88	75	9
	30	Rumah Hijau Organik Mason Group	NA	27	8	NA
	31	CV. Rizki Abadi	NA	26	26	0
	32	Mitra Sarana Energi (CPI)	NA	6	216	41
	33	Berkah Energi (CPI)	NA	NA	3	0
	34	Ujung Berung Mason Group	NA	NA	10	114
	35	Chera Mason Group	NA	NA	1	0
	36	Pahadang Madangu Mason Group	NA	NA	6	0
	37	CV. Wahana Rizki	NA	NA	138	2
	38	Rumah Ilham	NA	NA	0	204
	39	Energi Hijau	NA	NA	NA	9
	40	PT. IDL	NA	NA	NA	4
Cooperative	41	Koperasi Andini Luhur	4	NA	NA	NA
	42	KUD Tani Makmur	20	9	4	0
	43	KPSP Setia Kawan	4	NA	NA	NA
	44	KUD Semen	15	8	4	NA
	45	Koperasi SAE Pujon	16	42	25	NA
	46	KUD Tani Wilis	43	45	41	51
	47	KUD Sri Wigati	7	NA	NA	NA

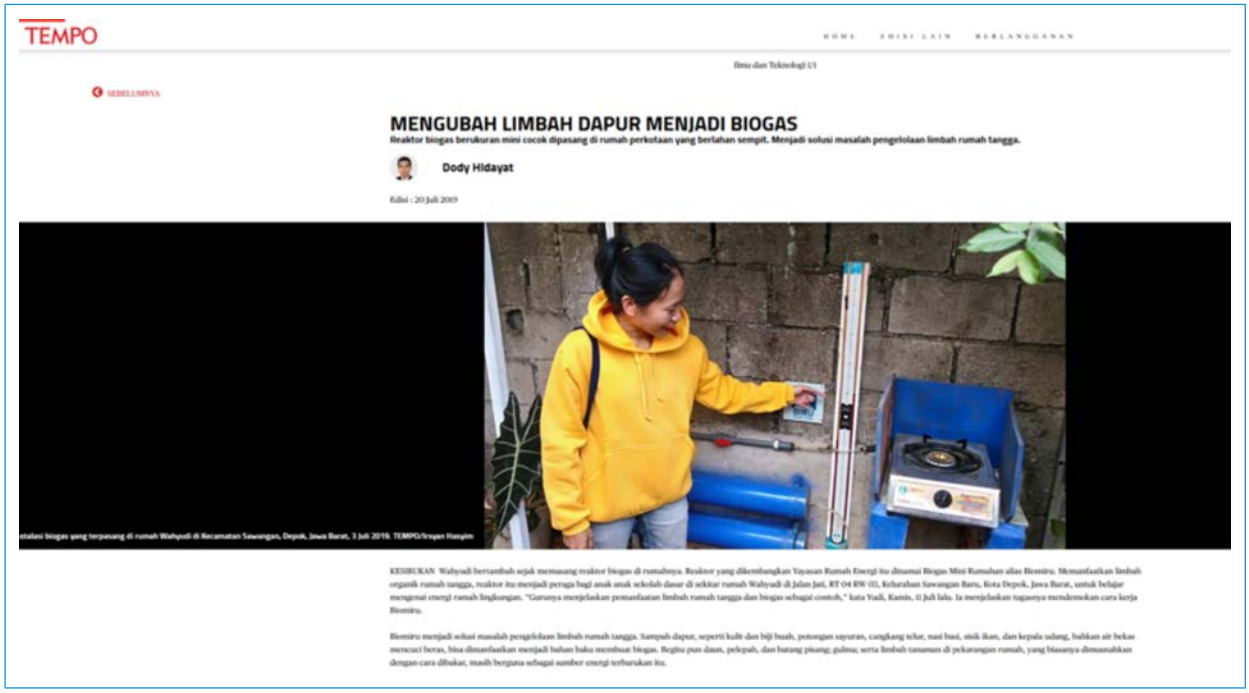
Annex

Business Type	No.	Address	Biodigester Construction			
			2016	2017	2018	2019
Cooperative	48	KAN Jabung	48	110	19	10
	49	KUD Sumber Makmur Ngantang	82	32	31	27
	50	KSU Bulu Saukang	82	18	2	0
	51	P4 Safana Cakrawala	37	2	NA	NA
	52	UD. Bontomarannu	74	2	0	0
	53	KSU Faeyza Jaya Bersama	28	21	NA	0
	54	Koperasi Jasa Peduli Kasih	38	40	30	4
NGOs	55	Yayasan Manikaya Kauci	67	37	4	70
	56	LKM Rukun Makmur	3	NA	NA	NA
	57	Yayasan Trukajaya	17	8	2	15
	58	Yayasan Suara Bhakti	3	6	1	NA
	59	LSPI At - Tayseer	8	NA	NA	NA
	60	Pusat Inkubasi Bisnis Usaha Kecil (Pinbuk)	602	323	106	NA
NGOs	61	Yayasan Sion	9	21	4	0
	62	Lembaga Pengembangan Teknologi Pedesaan (LPTP)	32	35	0	NA
	63	Lembaga Pendidikan dan Pemberdayaan Anak Bangsa (LPPAB)	11	4	0	NA
	64	Lembaga Pengkajian Kemasyarakatan dan Pembangunan (LPKP)	10	69	3	0
	66	Lembaga Pengembangan Pertanian Nahdatul Ulama (LPP-NU)	7	31	8	NA
	66	Yayasan Lembaga Pembinaan Masyarakat Desa (YLPMD)	9	12	10	0
	67	Yayasan Mitra Membangun Masyarakat Sejahtera (YM3S)	139	NA	NA	NA
	68	Yayasan Sumberdaya dan Lingkungan untuk Pelestarian Pembangunan (YSLPP)	205	120	0	0
	69	Yayasan Forum Perempuan Sumba (Foremba)	6	NA	NA	NA
	70	Yayasan Harapan Sumba	47	99	0	NA
	71	Lembaga Sosial Waimaringi	70	223	36	NA
	72	Yayasan Kontak Indonesia	32	31	31	13
	73	Yayasan Petta Haji Hasbullah	40	36	50	15
	74	Yayasan Prakarsa Swadaya Masyarakat (YPSM)	2	2	NA	NA
	75	Yayasan Sastra Loka Samgraha	36	34	22	4
	76	MPM Muhammadiyah Luwu Timur	NA	37	NA	NA
		Total number of CPOs in the agreement with IDBP	64	57	50	39
		Total Number of bio-digester built by all CPOs	3543	2296	1370	946

Annex 3: List of Lending Partner Organization in 2019

Province	No	Name of LPO
West Java	1	KPSBU
Central Java & D.I. Yogyakarta	2	Yayasan Trukajaya
East Java	3	KUD Tani Makmur
	4	KUD Tani Wilis
	5	KUD Sumber Makmur Ngantang
	6	KUD Anjasmoro
	7	KAN Jabung
	8	KUD Batu
	9	KUD Kertajaya
	10	KUD Tirto Mulyo Rejo
	11	KUB Sami Mandiri
Lampung	12	BMT As-Sa'adah

Annex 4: Media Publication after Editorial



TEMPO

MENGUBAH LIMBAH DAPUR MENJADI BIOGAS

Reaktor biogas berukuran mini cocok dipasang di rumah perkotaan yang berlahan sempit. Menjadi solusi masalah pengelolaan limbah rumah tangga.

Dody Hidayat

https://majalah.tempo.co/read/ilmu-dan-teknologi/158045/mengubah-limbah-dapur-menjadi-biogas?hidden=login

FIN FAJAR INDONESIA NETWORK

HOME NASIONAL NUSANTARA OLAHRAGA INTERNASIONAL FOTO VIDEO LIFESTYL

Beranda » Feature » Belajar Biogas dari Peternak Sapi Depok

Feature

Belajar Biogas dari Peternak Sapi Depok

Penulis: **Redaksi FIN** - Juli 23, 2019

GAS GRATIS: Wahyudi tengah memasak sarapan pagi dari biogas di gubuk Peternakan Sapi, Ponpes Assyafaat, Sawangan, Depok, Jawa Barat, Senin (22/7). Tim Rumah Energi menunjukkan proses gas metan hasil biogas mengalir ke kompor. (TOGAR HARAHAP/FIN)

FIN.CO.ID – Biogas, Solusi Jitu Pengganti Elpiji

Di saat kelangkaan elpiji melanda, warga resah. Namun, ada sejumlah warga yang tidak peduli berapapun kenaikan harga atau kelangkaan gas biru itu di pasaran. Seperti peternakan sapi di Depok yang menggunakan kotoran sapi sebagai pengganti gas melon.

TOGAR HARAHAP-Depok

Wangi bawang yang sedang digoreng menyeruak menusuk hidung hingga isi lambung. Bau yang menggetarkan perut itu berasal dari dapur sebuah gubuk kecil tak jauh dari kandang Peternakan Sapi Pondok Pesantren Assyafaat, Kelurahan Sawangan Baru, Kota Depok, Jawa Barat.

https://fin.co.id/2019/07/23/belajar-biogas-dari-peternak-sapi-depok/

radartasikmalaya KOTA TASIK TASIKMALAYA RAKYAT GARUT CIAMIS BANJAR

Umum

Peternak Sapi Menyulap Kotoran Menjadi Berkah

Biogas, Solusi Jitu Pengganti Elpiji

23 Juli 2019

Wahyudi tengah memasak sarapan pagi dari biogas di gubuk Peternakan Sapi, Ponpes Assyafaat, Sawangan, Depok, Jawa Barat, Senin (22/7). TOGAR HARAHAP / FIN GAS GRATIS

Di saat kelangkaan elpiji melanda, warga resah. Tetapi, ada sejumlah warga yang tidak peduli berapa pun kenaikan harga atau kelangkaan gas biru itu di pasaran. Seperti peternakan sapi di Depok yang menggunakan kotoran sapi sebagai pengganti gas melon.

https://www.radartasikmalaya.com/biogas-solusi-jitu-pengganti-elpiji/

Endev is funded by:

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