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**2021**

# Indonesia Domestic Biogas Program 2021

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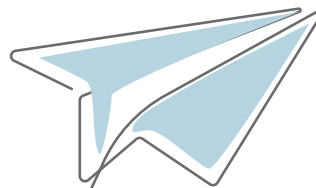
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# Abbreviations

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ASS	<i>After Sales Service</i>
ABgl	<i>Asosiasi Biogas Indonesia</i> (Association of Biogas Indonesia)
BIRU	<i>Biogas Rumah</i> (Domestic Biogas)
BPD LH	<i>Badan Pengelola Dana Lingkungan Hidup</i> (Environmental Fund Agency of Indonesia)
CPO	Construction Partner Organization
CSR	Corporate Social Responsibility
CUCO	Credit Union Counselling Office
DGNREEC	Directorate General of New, Renewable Energy and Energy Conservation
EnDev	Energizing Development
EUR	Euro
FGD	Focus Group Discussion
HIVOS	Humanist Institute for Cooperation with Developing Countries
IDBP	Indonesia Domestic Biogas Program
IDR	Indonesian Rupiah
LPG	Liquefied Petroleum Gas
LPO	Loan Partner Organization
LPDB	<i>Lembaga Pengelolaan Dana Bergulir</i> (Revolving Fund Management Institute)
MEMR	Ministry of Energy and Mineral Resources
MFI	Micro Finance Institutions

NTB	<i>Nusa Tenggara Barat</i> (West Nusa Tenggara Province)
NTT	<i>Nusa Tenggara Timur</i> (East Nusa Tenggara Province)
PE	Polyethylene
QC	Quality Control
SDG	Sustainable Development Goal
SME	Small Medium Enterprise
SNV	A Netherlands Development Organization
VPA	Voluntary Project Activity
YRE	<i>Yayasan Rumah Energi</i> (Rumah Energi Foundation)



# Executive Summary

The Indonesia Domestic Biogas Program (IDBP) is a multi-stakeholder's program which aims to disseminate renewable energy through small-scale household biodigester system also known as Domestic Biogas or *Biogas Rumah* (BIRU) in 16 provinces. Its main goal is to create a market for domestic biogas in Indonesia. By the end of 2021, the program has constructed 26,818 units of BIRU in different capacities ranges from 1 m<sup>3</sup> to 20 m<sup>3</sup>.

In February 2021, the Energize Development (EnDev) IDBP funding support was ended and since then, IDBP has been fully supported by the Carbon Fund and also Private Sectors and Organizations through CSRs and donations. A total of 1,661 BIRU units were built in 2021 with the highest achievements (67%) in West Nusa Tenggara (NTB) Province. This number was a large increase compared to 2020 achievement with only 390 units due to several factors related to Covid-19 such as budget transfers and restrictions on movement to carry out promotional activities.

There were three main success factors in 2021 achievements, namely the alignment between IDBP and the NTB Provincial Government Program i.e. the Zero Waste program, the livestock loan requirements 6 (where farmers should possess biodigesters to access the loan), and massive promotion on biogas and its derivatives. To strengthen its achievements, YRE in 2021 also implemented specific actions based on recommendations of the Biogas Market Study conducted in 2020, that include:

1. Installation of 25 units of pre-fabricated biogas made from fiberglass and Polyethylene (PE) as a pilot in the province of West Java, Central Java, D.I. Yogyakarta, and East Java.
2. Installation 47 smart biogas remote sensors in the provinces of Central Java, D.I. Yogyakarta, East Java, NTB, and South Sulawesi.
3. Provision of Bio-slurry Support Facility (BSF) to two selected CPOs i.e. KUD Sumber Makmur Ngantang in East Java and CV. Rizki Abadi in South Sulawesi.
4. Participation in the discussion on the Preparation of the Biogas Roadmap which was held by the DGNREEC.
5. Implementation of stakeholder engagement approach to local governments in gaining support for IDBP activities.
6. Implementation of strategic marketing approach to companies and institutions that also have community empowerment programs through biogas technology.

In order to complement aforementioned actions, YRE and Hivos collaboratively conducted two studies in 2021. The first study was titled “Economic, Social, and Environmental Impacts of Livestock Management Policy Study”, that aims to provide in-depth analysis and recommendation on policy models to manage livestock waste better based on a thorough assessment of environmental, social, and economic impacts of livestock waste. The study has served as a basis for further advocacy to relevant Ministries/Agencies/Local Government.

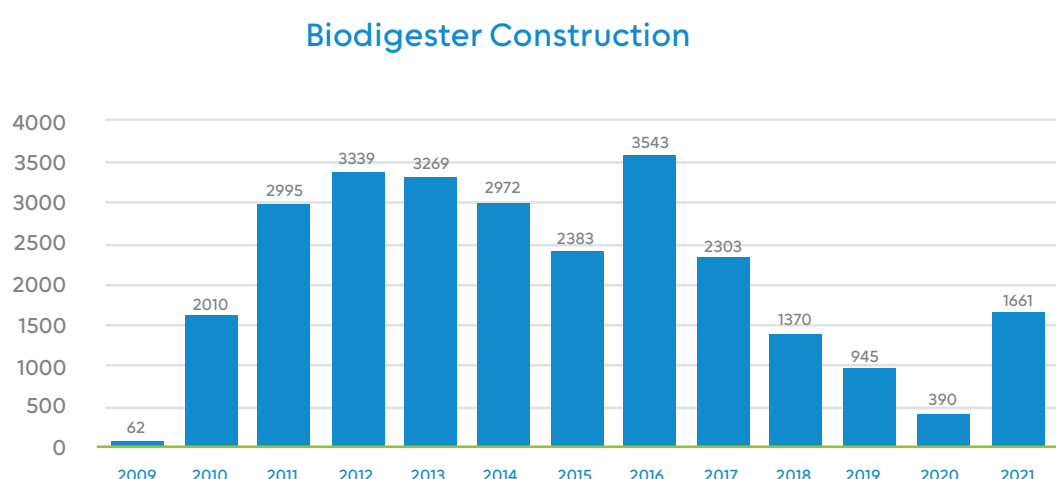
As a follow up to the policy study, YRE submitted a concept note to Badan Pengelola Dana Lingkungan Hidup (Environmental Fund Agency of Indonesia/BPDLH), seeking its financial support to the IDBP's cooperative partners as revolving funds as preferred instrument to increase the number of installed biogas and to strengthen its enabling ecosystem in Indonesia. Unfortunately, *Direktorat Jenderal Energi Baru Terbarukan dan Konservasi Energi* (Directorate General of New, Renewable Energy and Energy Conservation/DGNREEC) funding was focused on biomass. However, as a form of support in achieving sustainable biogas development, in May 2021 DGNREEC) in collaboration with Gadjah Mada University prepared a sustainable biogas roadmap. The data study and information collection were conducted collaboratively by involving the government and biogas actors, such as YRE, ABGI, PT. SWEN, DiBiCoo, and also biogas experts.

The second study was called the "Bio-slurry Fertilizer Market Assessment", that aims to provide recommendations in resolving constraints and challenges related to the limited potentials of bio-slurry. Based on the recommendation of the Bio-slurry Fertilizer Market Assessment, YRE considered taking the opportunity to become bio-slurry off taker from BIRU user households in East Java in the first year, considering that East Java is the province with the largest number of BIRU digesters. This opportunity also aims to reduce drop-off digesters because households can earn additional income from selling their bio-slurry. The initial step that YRE carried out in October 2021 was to approach four cooperatives that could take role as bio-slurry supply partners.

Table below shows performance indicators of IDBP in 2021:

## 1. Digester Construction

### 1.1. Number of digesters in year





# Executive Summary

## 1.2. Number of people gains access to clean cooking energy

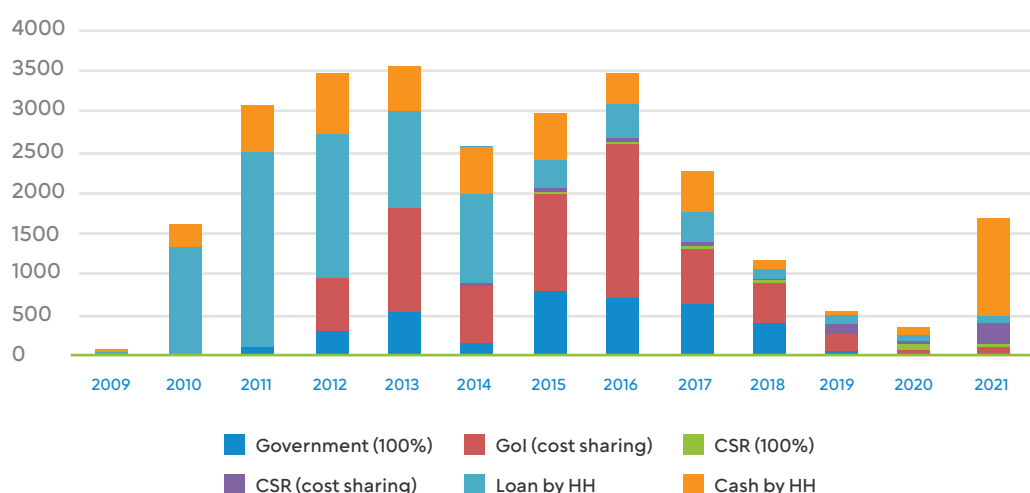
126,234 people have gained access to clean energy for cooking resulting from the construction of 26,818 units of digesters. In 2021 alone, 7,082 people have gained access to clean energy for cooking from 1,661 units of digesters.

## 1.3. Number of digesters per size of digester

Province	2009 to 2020	2021	1m <sup>3</sup>	2m <sup>3</sup>	3m <sup>3</sup>	4m <sup>3</sup>	6m <sup>3</sup>	8m <sup>3</sup>	10m <sup>3</sup>	12m <sup>3</sup>	20m <sup>3</sup>	Total
Lampung	603	0	0	0	0	0	0	0	0	0	0	603
West Java +Banten	1,697	57	2	0	0	51	0	1	0	3	0	1,754
Central Java	1,559	109	5	0	0	6	65	14	5	14	0	1,668
D.I. Yogyakarta	2,409	6	1	0	0	1	2	0	0	2	0	2,415
East Java	8,377	313	7	2	0	7	205	68	15	9	0	8,690
Bali	1,329	9	0	0	0	4	1	2	0	2	0	1,338
NTB	5,297	1,116	891	158	0	59	4	3	0	1	0	6,413
South Sulawesi	2,767	31	1	0	0	23	4	2	0	0	0	2,798
NTT (Sumba)	1,124	0	0	0	0	0	0	0	0	0	0	1,124
Central Sulawesi	21	0	0	0	0	0	0	0	0	0	0	21
South Sumatera	4	0	0	0	0	0	0	0	0	0	0	4
Southeast Sulawesi	0	12	0	0	0	1	10	1	0	0	0	12
Gorontalo	0	8	0	0	0	0	8	0	0	0	0	8
<b>Total</b>	<b>25,157</b>	<b>1,661</b>	<b>907</b>	<b>160</b>	<b>0</b>	<b>160</b>	<b>291</b>	<b>91</b>	<b>20</b>	<b>32</b>	<b>0</b>	<b>26,818</b>

## 1.4. Funding sources for digesters

IDBP Financing Model



The table shows that in 2021 most of the biodigesters are self-funded by the households: through loan (5%) and cash (70%).



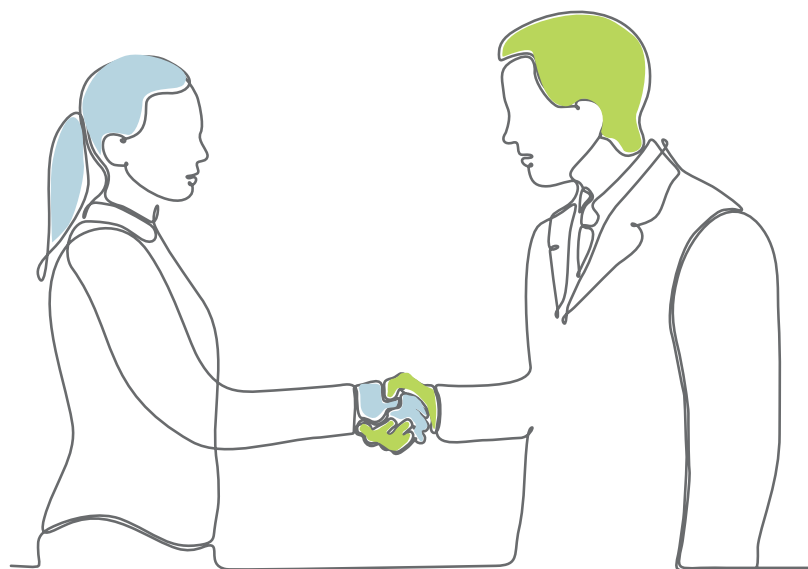
## 2. Quality Inspection and After Sales Service

### 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	1,844	1,588	20,684
2018	1,370	23,821	22,363	1,167	775	21,851
2019	946	24,767	22,775	652	315	22,503
2020	390	25,157	23,043	208	3	22,711
2021	1,661	26,818	23,774	565	0	23,276

### 2.2. Job Creation

The biogas sector has considerable contribution in the absorption of labor. In 2021, a total of 1,661 biogas digesters have been built and there are 83 jobs created from the biogas supply chain, 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.



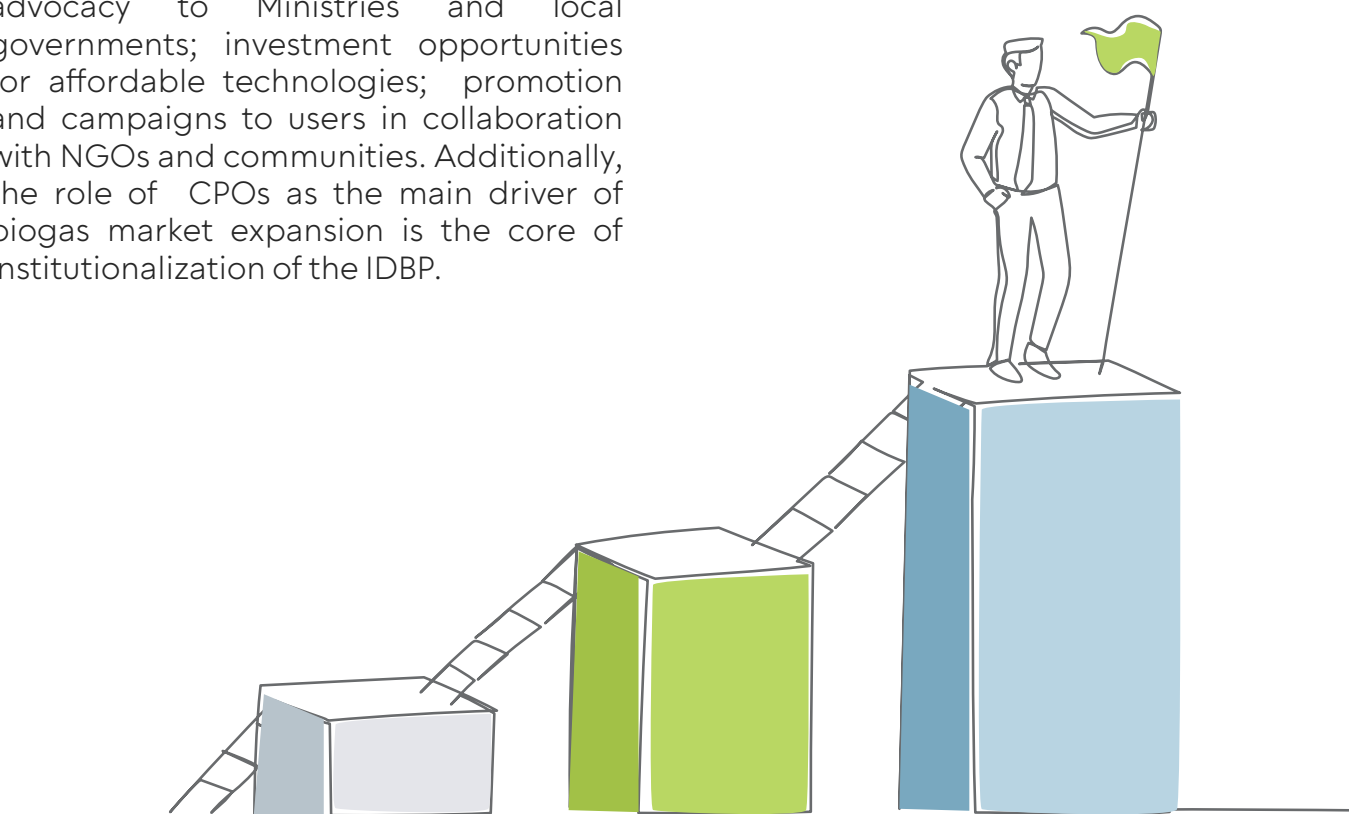
# JOURNEY OF IDBP 2009-2021

The establishment of the IDBP was recommended by a feasibility study undertaken in 2008 by biodigester specialists. Their study indicated promising prospects for the development of a biodigester sector in Indonesia, applying a development strategy that has already been successfully employed in various other Asian countries (Nepal, Cambodia, Vietnam, and Laos).

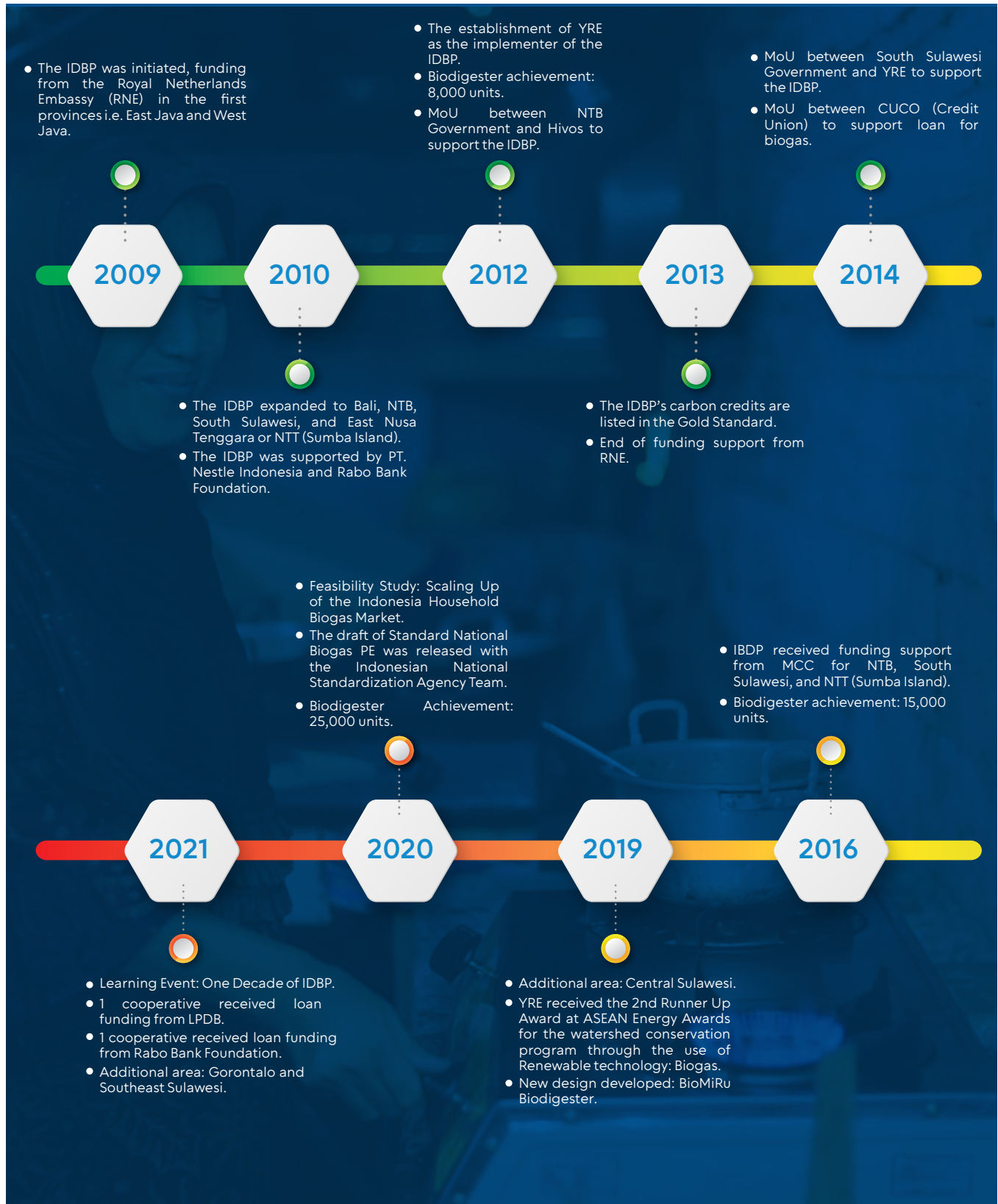
The Dutch Embassy in Jakarta funded a project based on a proposal dated 6 April 2009 submitted by Hivos. The IDBP was set up by Hivos with technical assistance from SNV, allowing Hivos to benefit from SNV technical expertise, resources and (international) networks.

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.

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 has 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.



# The Indonesia Domestic Biogas Program (IDBP)



# 2 OVERVIEW 2021

December 2020	25,157 units biodigester constructed
January	Result of Economic, Social and Environmental Impacts of Livestock Management Policy Study was released
February	Result of Market Assessment in Bio-slurry was released
March	Learning Event: One Decade IDBP
April	47 Smart biogas remote sensor were installed in 47 biodigester in five provinces
May	YRE shared “The role of women in the renewable energy sector” in APEC Workshop
June	Workshop: <i>Koperasi sebagai Agen Perubahan dalam Pembiayaan Mitigasi dan Adaptasi Perubahan Iklim</i> (Cooperatives as Agents of Change in Financing Climate Change Mitigation and Adaptation)
July	New Area: eight units biodigester were constructed in Gorontalo
August	MoU Signing with ExxonMobil Cepu Limited on Biogas 2021 Bojonegoro Program
September	Six units biodigester were constructed in Central Java with support from donation raised by Tani Foundation
October	YRE was registered as IDBP Project Developer in Gold Standards
November	Webinar: <i>Membuka Akses Pembiayaan Aksi Perubahan Iklim ke Tingkat Tapak</i> (Providing Financing Access on Climate Action to the Grassroots Level)
December	26,818 units biodigester were constructed 1,661 units additional biodigester were constructed in 2021

## 2.1. WORK AREA



In 2021, as many as 1,661 biodigester units were built in nine provinces with the addition of two new provinces i.e. Gorontalo and Southeast Sulawesi. The expansion to these two new provinces was expected to be a trigger for more biodigester construction.

Since 2019, YRE has gradually closed down offices in several provinces, and instead, focused more on the profitable provinces. By doing so, YRE was able to provide comprehensive support for CPOs in the area. Those two profitable provinces are located in Central Java (now act as representative in the Western Indonesia) and in NTB (now act as representative in the Eastern Indonesia). YRE believes that the 12 construction partners who have been collaborating in the IDBP can independently develop the biogas market in their area.

In terms of program development in other provinces, with supports provided by the private companies, YRE did not only offer the biogas installations, but also training and development for CPOs and biogas local masons in the new provinces. It was expected that they will contribute to the biogas market development.





## 2.2. DATA, TECHNOLOGY, AND INNOVATION

### 2.2.1 IDBP Data Analytic

The implementation of IDBP has covered 16 provinces in Indonesia, where YRE routinely collects various information and data on developments on the field such as units damages, loan payment, and availability of raw materials.

The data and information technology development has brought the possibility to utilize them as tools for optimization and work efficiency. On a commercial scale, customer data and information can be used to optimize the promotion of a particular product. In non-profit industry, they can be utilized to see the potential impact of changes that can be made from the activities of social organizations such as YRE. The existing data can be processed to obtain an in-depth view of a trend, potential and opportunity for optimizing activities in the field.

For this reason, since 2020, YRE worked with Inclusivo, a consulting firm engaged in data-based knowledge management, to conduct in-depth IDBP data processing and analyzing for IDBP optimization. Here were deliverables produced by Inclusivo by answering these questions:

#### 1. What is the effective amount of the subsidy?

The effectiveness of the subsidy was measured by looking at the functioning of the biogas installation in relation to the financing scheme for the construction of the biogas installation, specifically related to the amount of subsidies provided.

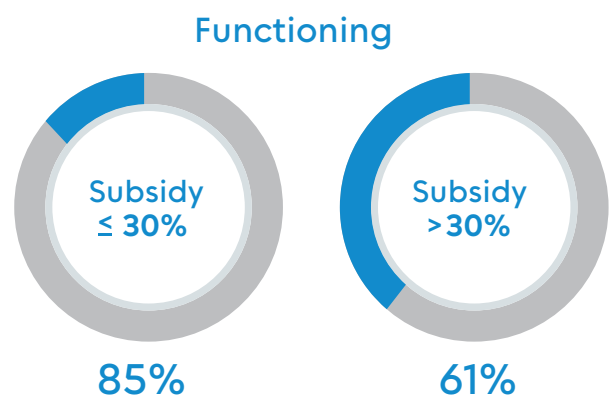


Chart 1. Comparison of functioning biodigester with subsidy <30% and with subsidy >30%

The subsidy ≤30% became effective as a financing mechanism for biogas installations because most biogas installations that receive a subsidy ≤ 30% were still functioning well, compared to biogas installations that receive subsidies above 30%.

#### 2. What is the most effective financing scheme?

Inclusivo compared the current five financing schemes to find the most effective one by juxtaposing the financing mechanism and their biogas functioning status. The analysis found out that the most effective 13 financing scheme is a scheme that combines CSR and users contributions (swadaya) of 86.5%. Apart from these schemes, almost all schemes that involve users' contribution had a high level of effectiveness. This could be interpreted that the role of community or user involvement in the construction of biogas installations greatly determines the effectiveness of a biogas installation.

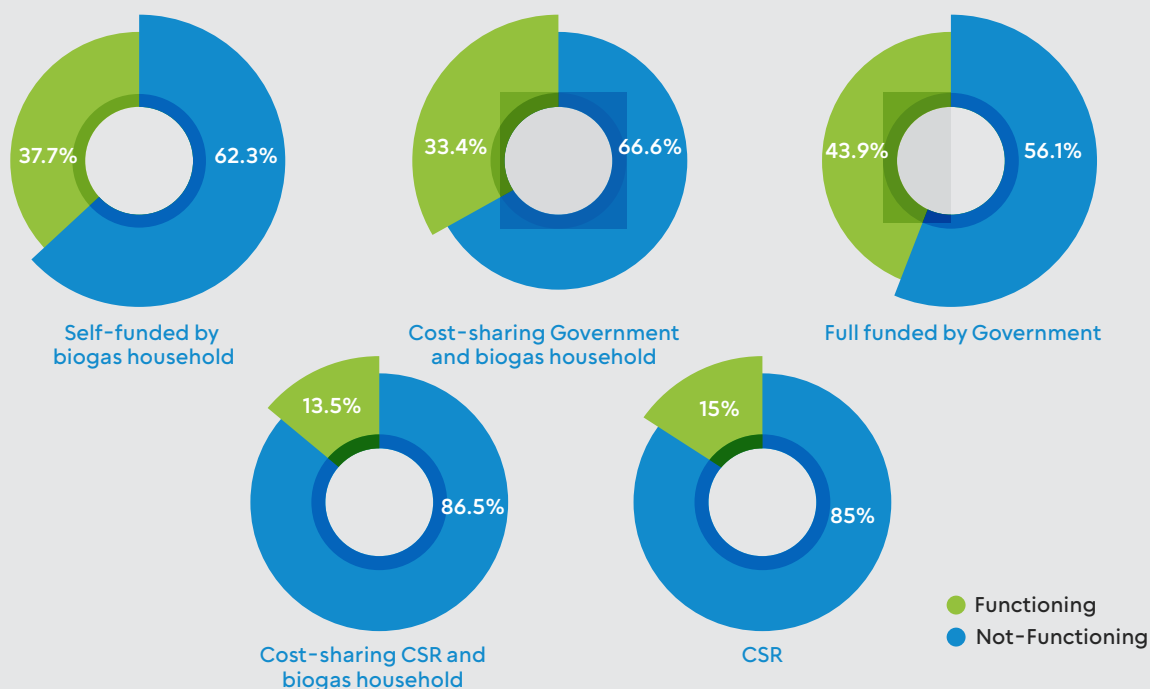


Chart 2. Percentage of functioning and non-functioning biogas digester based on each financial scheme

### 3. What is the Willingness to Pay Value based on loan data from cooperatives?

YRE involved eight cooperatives to analyze data on biogas users with credit financing schemes, namely KAN Jabung, KUD Sumber Makmur, KUB Sami Mandiri, KPSP Setia Kawan, North Bandung Cattle Breeders Cooperative, and Trukajaya. Data of these cooperatives showed that the value of willingness to pay of biogas users is IDR 4,700,000 for payment periods of 12, 24, and 36 months. From this data, it was also found that the most current installments are in the range below IDR 154,000 per month.

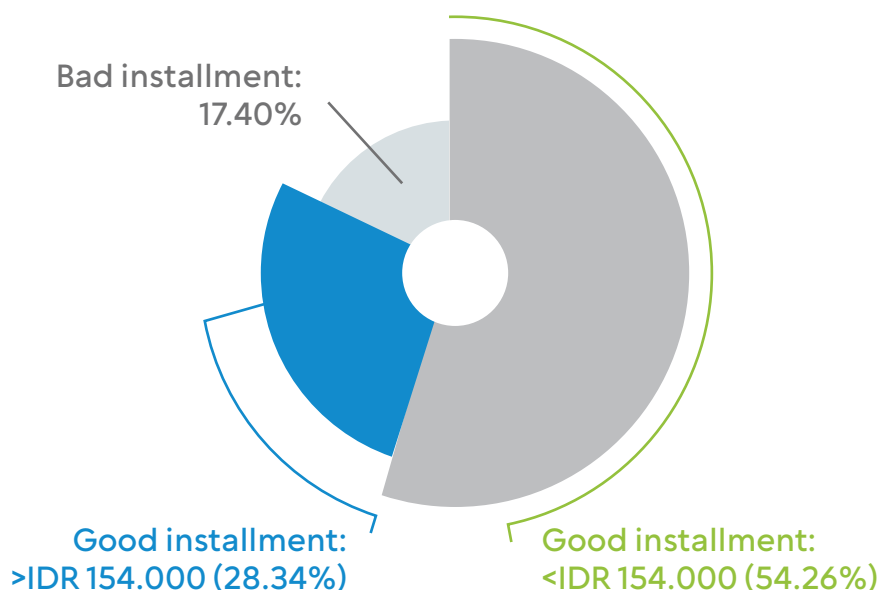


Chart 3. Performed installment Vs non-performed installment



## 2.2. DATA, TECHNOLOGY, AND INNOVATION

### 4. What is the effective installment period for biogas users?

Inclusivo also obtained data from aforementioned eight cooperatives that showed out of 81% of still functioning biogas units have positive payment, most of users opted to the 36 months installment period.

### 5. What is the effective installment period for biogas users?

What is the average income of livestock farmers who can be the main target market of biogas? In September 2021, YRE conducted a socio-economic survey. Of the 1,400 biogas users surveyed, only 333 users had biogas by credit, and of the 333 biogas users, only 68 of them had paid off their loan. It means that only 265 users could be analyzed. Afterwards, YRE and Inclusivo divided the 265 biogas users into several classes of installments (payback amount per month) taken, so that the following results were obtained as follow:

Installment amount (IDR) per month	Number of biogas users
< 500,000	117 users
500,000 – 1,000,000	80 users
1,000,000 – 2,000,000	44 users
2,000,000 – 3,000,000	12 users
> 3,000,000	12 users

The table above shows that most users prefer installment amount of <IDR 500,000 per month. These 117 biogas users were dominated by people who have a monthly income of IDR 1,000,000–IDR 5,000,000. It could be concluded that the community group with a monthly income in that range would be the target market for biogas development.

### 2.2.2 BioMiRu Prefabricated

After installation of five BioMiRu in Bogor in December 2020 with in-kind support from a water tank factory named UD. Ragam Lestari Indah Cemerlang, YRE continued to produce 20 units of prefabricated BioMiRu to be installed in Central Java, D.I. Yogyakarta and East Java in February 2021. Government.



Picture 1. Installation of Biomiru Prefabricated

Installation in these three provinces involved four CPOs i.e. CV. Mitra Bumi Abadi, Blora Mason Group, Mitra Sarana Energi, and Rumah Ilham. Before installation, YRE conducted training for those CPOs to properly install the prefabricated BioMiRu. After six months installation, there were some evaluation points which are:

1. Prefabricated BioMiRu is easy to be installed and only need 1-2 days for installation
2. The technology is suitable for small space
3. The outer layer of prefabricated BioMiRu is thick and easy to leak
4. Gas holder in the dome is very small
5. Risk of blockage

Based on the evaluation, YRE will reconsider continuing production of prefabricated BioMiRu in the near future. One of the way is by having collaboration with water tank company to produce BioMiRu. Several discussions had been made with two companies but one rejected the idea due to incompatibility of raw materials for biogas purposes. On the other hand, the other company was open for this opportunity as they already produced biogas tanks, but the problem remained on area outreach.

In terms of standardization, YRE worked closely with the Indonesian BSN (National Standardization Agency) to provide standards and procedures of PE biogas installation. At the end of 2020, the standard draft document was released and in 2021 the DGNREEC held several meetings with biogas experts (who are members of the technical committee), YRE, and BSN, on this matter. It is assumed that the standardization will be approved in early second semester of 2022.

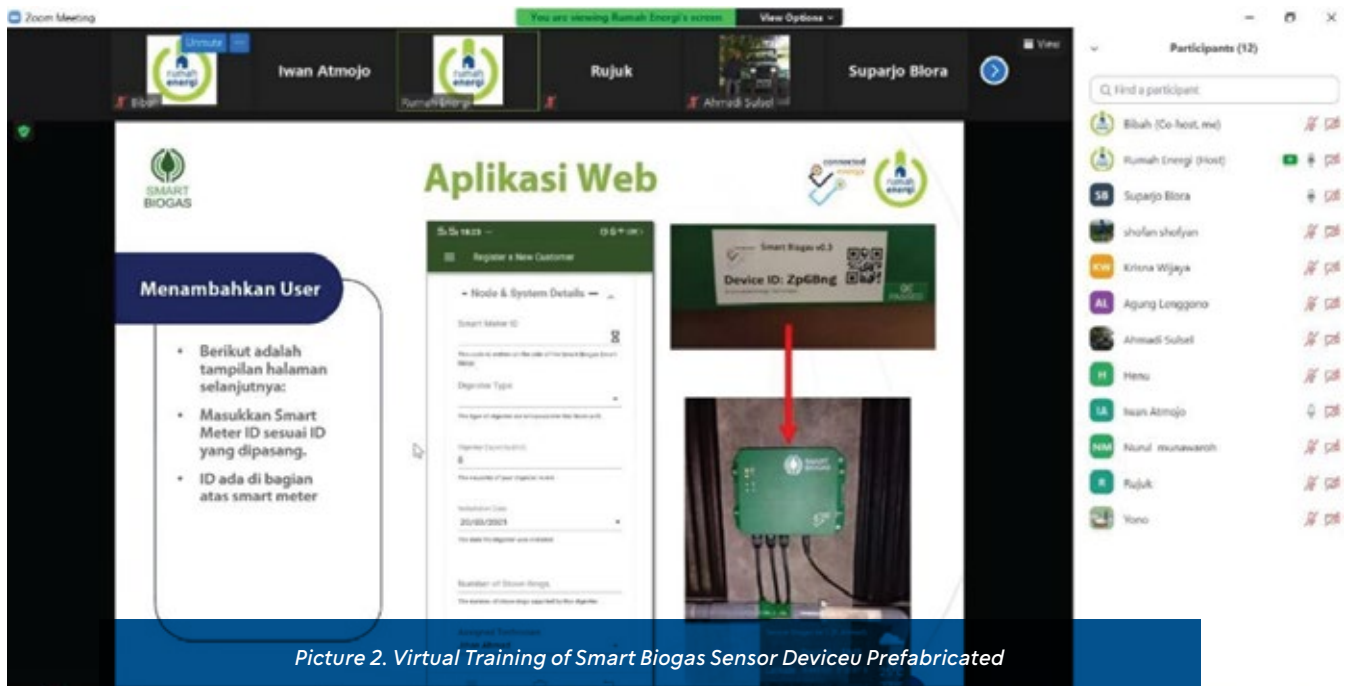
## 2.2.2 Smart Biogas Sensor Device

The 2021 annual biogas survey showed that at least 70%-80% of biogas were well-functioning, and the rest were not functioning well or inactive due to some of technical issues or any other non-technical reasons (i.e. sold cattle). There was a need to effectively periodically monitor the biogas functioning. Since its establishment, BIRU had been conducting annual inspection by Field Officers at least two times per unit after installation.

However, more efforts were needed to monitor biodigester on the field in real time. Therefore since 2021, YRE worked with Inclusive Energy, a Scotland-based biogas sensor manufacturer, to install 47 biogas sensors in five pilot provinces (Central Java, D.I. Yogyakarta, East Java, NTB, and South Sulawesi). The 16 installations involved six technicians from CPOs in respective provinces. Table below provides number sensors installed in each province.

Province	No. of SB sensor installed
Central Java	11
D.I. Yogyakarta	1
East Java	17
NTB	10
South Sulawesi	8

## 2.2. DATA, TECHNOLOGY, AND INNOVATION



Besides practicality, Smart Biogas Sensor Device provides three main benefits. First, it monitors and provides precise analysis and measurement of methane avoidance and energy consumption. Second, it provides precise data on biodigester pressure and flow variables (feeding consistency, leakage, consumption volume, & performance characteristics per digester size). Third, it enables real-time monitoring to monitor user consumption behavior analysis (cooking duration and cooking hours) and an immediate follow-up for any technical malfunction.

This technology has been approved by the Gold Standard as the biogas supporting appliances which is able to assist individual or groups especially an organization who conduct carbon monitoring activities. This new method has complemented the biogas monitoring activity by Field Officers and also annual survey by third party.



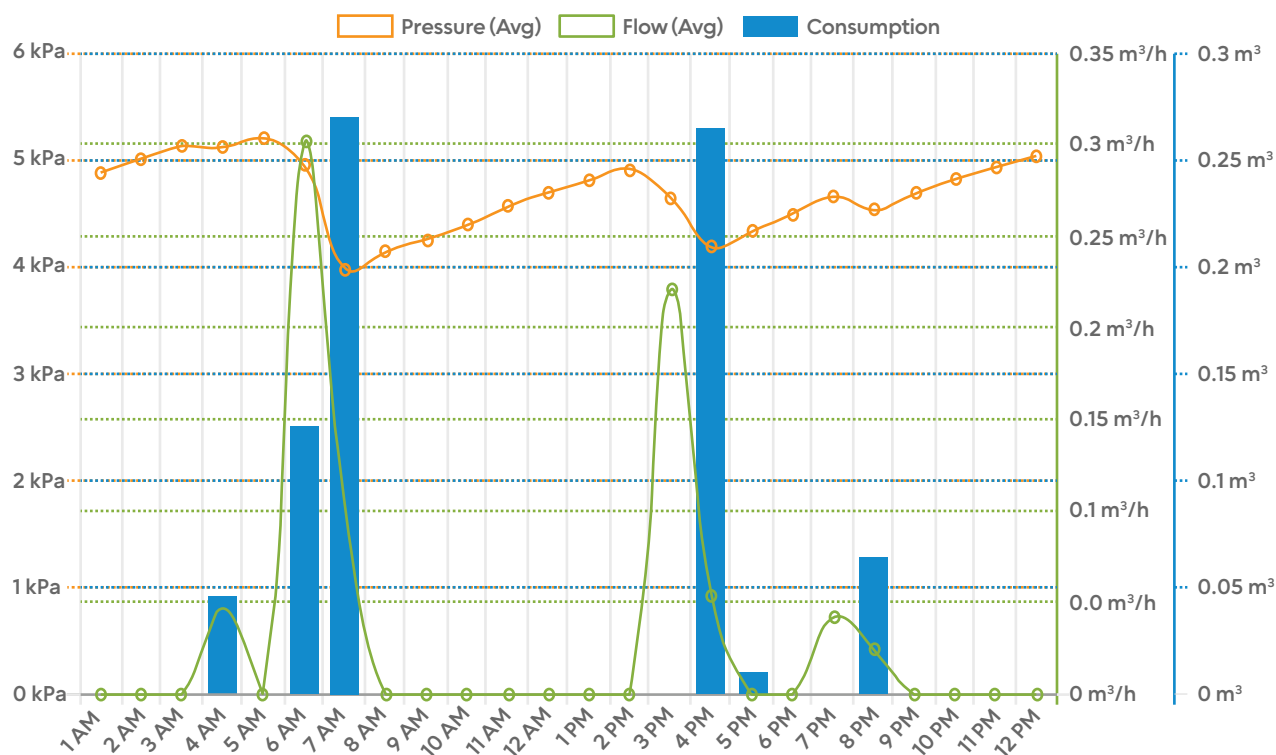


Chart 4. Smart Biogas Sensor Device indicators (pressure, flow, and consumption) as shown on the web application

The data in the web-app then was analyzed after several months of installation. The chart below provides one of 47 installed sensor analysis.

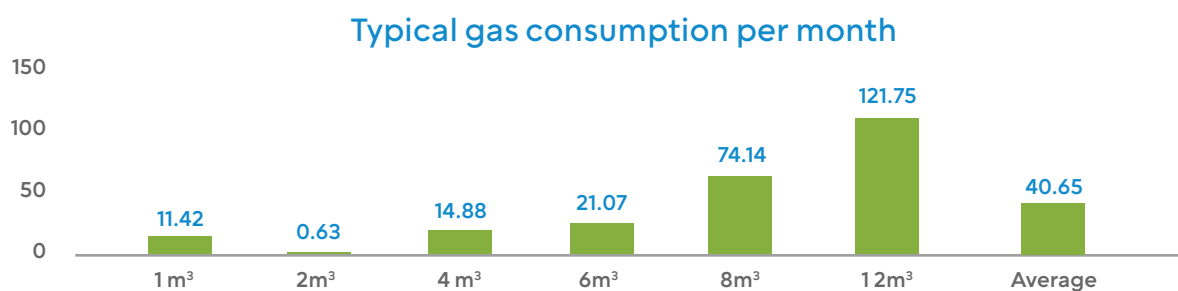


Chart 5. Gas consumption amount per month based on the size of each biodigester

Daily consumption profile for 4 and 6 m<sup>3</sup> size shows that they were actually not optimally consumed, despite it may produce up to 1.5–2.0 m<sup>3</sup>/day of biogas. While the 8 and 12 m<sup>3</sup> size shows optimum gas consumption daily. With an average of 40.65 m<sup>3</sup> consumption per month, it might replace fossil fuel consumption of about 10,536.81 MJ/year.

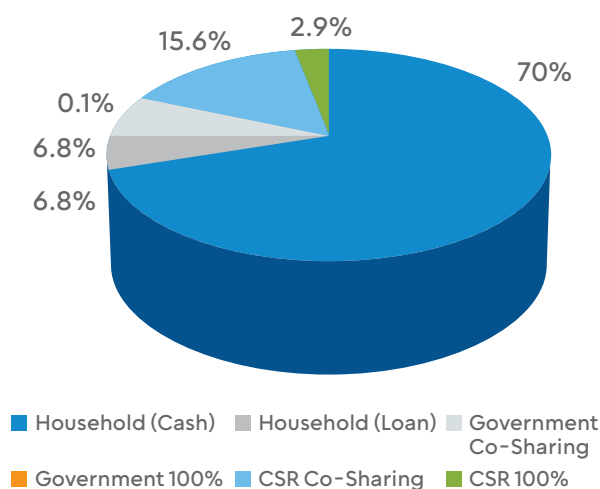
However, the technology is considered expensive since there the product was imported. Therefore, there is a need of collaborative projects with private companies or the government and include the technology cost to biodigester unit cost.



## 2.3. FINANCIAL SUPPORT

Since April 2021, YRE continues to implement IDBP in a more independent way of financing through carbon management with Gold Standard. YRE realized that affordable financing holds an important role to increase households' access to biogas for IDBP sustainability. Hence the financing scheme provided for biogas construction was a combination of subsidies and loans.

**Distribution of Biodigester Construction Financing Scheme in 2021**



**Chart 6. Distribution of biodigester construction financing scheme in 2021**

A total of 1,661 units of biodigesters built in 2021 were mostly financed independently by households. Of that number, 70% of users paid the construction cost through cash, while others paid through loan. The second highest financing scheme used was CSR co-sharing through companies (15.6%) followed by government co-sharing (6.8%). Only a few of users bought their biodigester construction support through 100% funding from companies' CSR (2.9%), and the government (0.1%) (Chart 6).

### 2.3.1 Company and Institution Co-Sharing

There were a total of 16 companies, cooperatives, and organizations who provided financial support for biodigester construction in 2021. Among them were KAN Jabung, CU Savan Sibarrung, ExxonMobil Cepu Limited Indonesia, Indolakto, Indonesia Power, Jasa Marga, LSM Sintesa, Lingkar Temu Kabupaten Lestari (LTKL), PT Nestle Indonesia, Perum Jasa Tirta II, Tokopedia, PT. Insight Investment, PT. Pertamina, Tani Foundation, Yayasan Idep, and Yayasan Trukajaya.

Company co-sharing scheme mostly financed the biodigester constructions in East Java with a total number of 190 units. This number was mainly contributed from 100 units of biodigester built in Bojonegoro District that was supported by ExxonMobil Cepu Limited (EMCL). Through a program called "Increasing Economy with Biogas Energy Utilization", YRE and EMCL contributed to the Green Economy Program of Bojonegoro District Government, and it was estimated that up to 250 tCO<sub>2</sub>e per year is reduced by this project. Biogas installation in this program provided great impact ranging from household cost saving, manure waste reduction, to business opportunity development. Beneficiaries were also increased their capacities in biogas maintenance training, bio-slurry training, and gender action learning system (GALS) training.

### Biogas Constructions with Company Co-Sharing Scheme

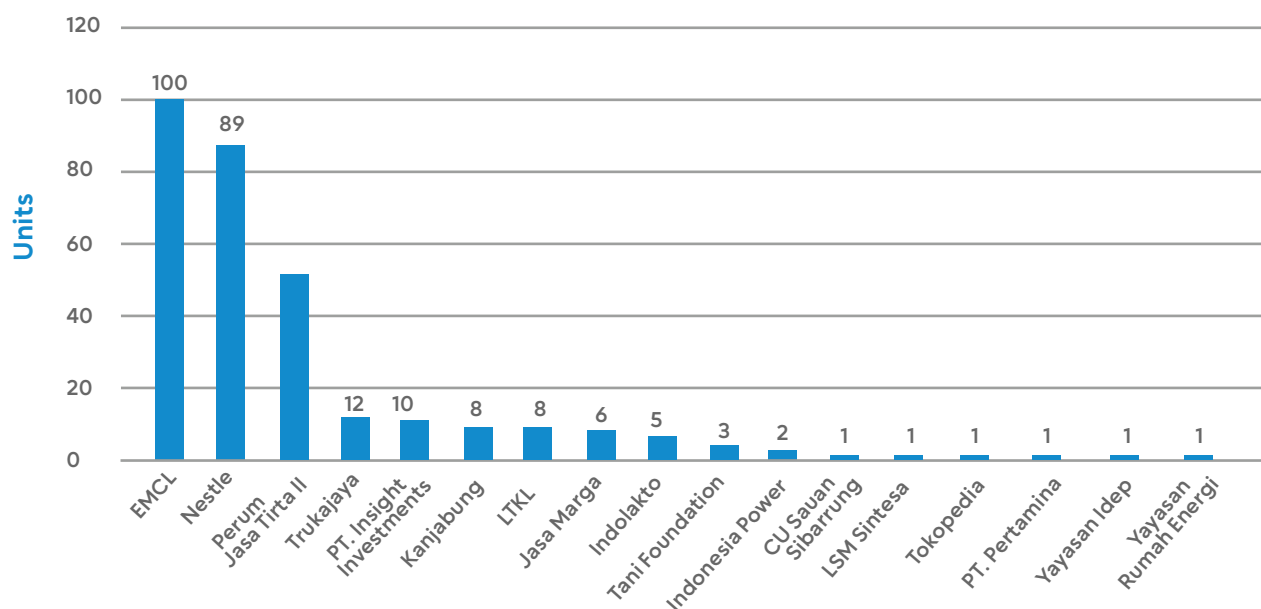


Chart 7. Number of biogas construction with company co-sharing scheme



In NTB, there were 10 units of biodigester construction financed by PT. Insight Investments Management. PT. Insight is an investment manager company whose mission is to transform investments into social impact through supporting the achievement of SDGs in Indonesia. YRE's collaboration with PT. Insight was not only oriented towards biodigester construction, but also cultivated user's understanding about the benefits of biogas in creating a household-scale circular economy scheme.

## 2.3. FINANCIAL SUPPORT

### 2.3.2 Government Co-Sharing

Co-sharing financing with the government was mostly found in Central Java. This number reflected the immense success of the self-management program, or so called “swakelola”, by the Central Java Provincial Department of Energy and Mineral Resources. Swakelola program is a government program which involves the beneficiaries and community in the implementation stage. Many positive impacts have been generated since the swakelola implementation, such as facilitating field monitoring, increasing empowerment value by knowledge transfer from trainers to the locals, bringing out self-reliance value which eventually gains users’ self-belonging to the program, leveraging users’ creativity to scale up biogas into new business, igniting integrated mindset of renewable energy program, and preserving local wisdoms.

In 2021, 45 biodigesters in Central Java and 16 biodigesters in NTB were built through the swakelola program by each provincial government. One key success factor of these achievements was field assistance provision to local farmers groups and communities through human resource management and capacity building. IDBP looks forward to more similar initiatives by other provincial governments in Indonesia.

### 2.3.3 Loan Funding Scheme Development

#### LPDB - KSPPS AI-Roudloh

Another biogas financing option since 2020 was the LPDB under the Ministry of Cooperatives and SMEs (MCSME) Indonesia. YRE proposed nine potential LPOs from various biogas credit schemes in Central Java, East Java, NTB, and South Sulawesi to be incorporated in LPDB’s 2021 lending pipeline.

LPOs from various biogas credit schemes in Central Java, East Java, NTB, and South Sulawesi to be incorporated in LPDB’s 2021 lending pipeline. All of the nine cooperatives were approved to be in LPDB’s pipeline in early November 2020. Following up efforts in regards to the approval, YRE assisted each cooperative in the proposal-making process, preparation of supporting documents, and submission process to LPDB. In January 2021, three cooperatives in Central Java submitted documents required by LPDB and have been in the process of data checking by the regional LPDB.

KSPPS AI-Roudloh, one of the cooperative loan grantees, received an amount of IDR 2 billion loan disbursement in late September 2021 from LPDB. The disbursement was then used for the development of agriculture, animal husbandry, and biogas. Biogas constructions took 30% of the total budget or worth for a total of 60 new biogas units.

#### Rabo Bank Foundation - PUSKOPDIT Jatra Miguna

In October 2021, RBF provided an amount of IDR 4,5 billion loan for PUSKOPDIT Jatra Miguna. The loan was utilized for agriculture, animal husbandry, and biogas program development by the cooperative's members. Only 30%, or equivalent of IDR 1 billion from the total loan could be applied for biogas. That percentage of loan could support 100 units of new biogas construction.

Furthermore, Jatra Miguna strive to implement this loan program in their other Credit Union (CU) in East Nusa Tenggara. To expand the biogas market to East Nusa Tenggara, it needs proper feasibility study (including local technical capacities), advocacy, and promotion to local stakeholders.



## 2.4. COMMUNICATION ACHIEVEMENT

In developing the biogas market for IDBP, it is necessary to carry out a marketing strategy to the right target. The 5 P's of marketing that have been carried out by YRE in 2021 are provided below:

### 1. Product

The technology of the IDBP has an advantage over other biogas product variants, where the dome shape of the biogester is made of brick and concrete and installed underground which allows to avoid physical damage and save space.

### 2. Price

The technology of the IDBP is more profitable because it is considered a long-term investment.

### 3. Place

The technology of the IDBP is marketed offline and online.

### 4. People

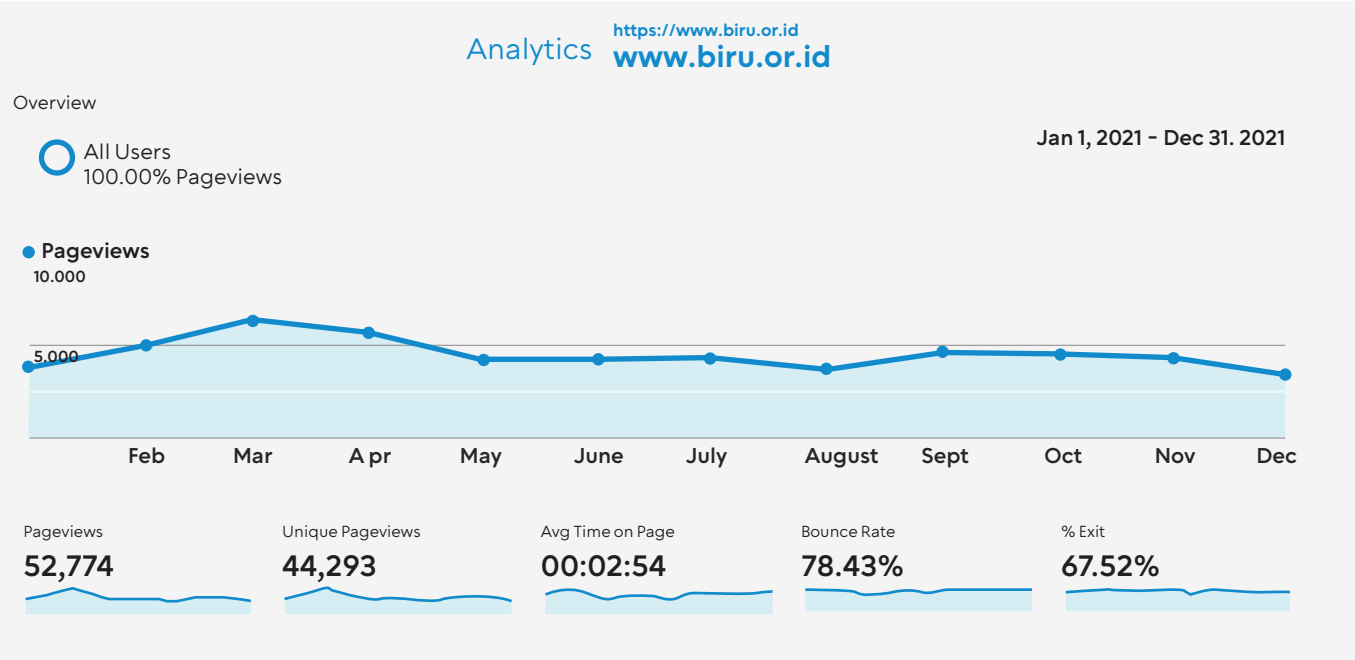
The offline promotion of the technology is promoted through CPOs.

### 5. Promotion

The online marketing penetration is promoted through digital promotion using multiple platforms.

### 2.4.1 Website: [biru.or.id](https://www.biru.or.id)

BIRU website ([biru.or.id](https://www.biru.or.id)) is one of the communication channels that is used as a center for information and knowledge about the IDBP, biogas technology, the utilization of bio-slurry, as well as the publication of news and success stories. Through the website, the public can access information related to the updated biogas installation development and also access to contacts if they are interested in installing biogas independently or through cooperation schemes. Below is the insight of the website traffic:



## 2.4. COMMUNICATION ACHIEVEMENT

Page		Pageviews	%	Pageviews
1. /index.php		7,617		14,43%
2. /2017/03/19/3180/mengubah-biogas-menjadi-listrik.html		5,518		10,46%
3. /2018/03/16/4481/mengubah-kotoran-hewan-jadi-sumber-energi-alternatif.html		3,229		6,12%
4. /fixed-dome		2,590		4,91%
5. /2017/02/09/3267/biogas-untuk-mengurangi-emisi-gas-rumah-kaca.html		1,994		3,78%
6. /Portofolio/koperasi-peternak-sapi-bandung-utara-kspbu		1,762		3,34%
7. /bioslurry		1,508		2,86%
8. /2015/03/04/3618/atasi-kotoran-ayam-biogas-solusinya.html		1,009		1,91%
9. /2017/01/01/4381/5/desa-di-indonesia-ini-bukti-nyata-transisi-energi-biogas.html		976		1,85%
10. /en/home		924		1,75%

Chart 8. Data analytic of the website pageviews

Based on the data above, it can be seen that the total pageviews of the website in 2022 has reached 52,774 with 44,293 unique pageviews and an average page visit time of about 2 minutes 54 seconds. It can be assumed that viewers other than aimed to seek information, they also spent their time reading the articles. This aligned with the majority of viewers who visited articles on biogas utilization, such as *Mengubah Biogas Menjadi Listrik* (Converting Biogas to Electricity) with 5,518 visits or 10.46%. In addition, the most visited articles were articles about sharing knowledge, such as *Mengubah Kotoran Hewan Jadi Sumber Energi Alternatif* (Turning Animal Manure into Alternative Energy Sources) with 3,229 visits. Meanwhile, the most searched keywords on the website were “fixed-dome” 2,590 times of search and “bio-slurry” 1,508 times of search.

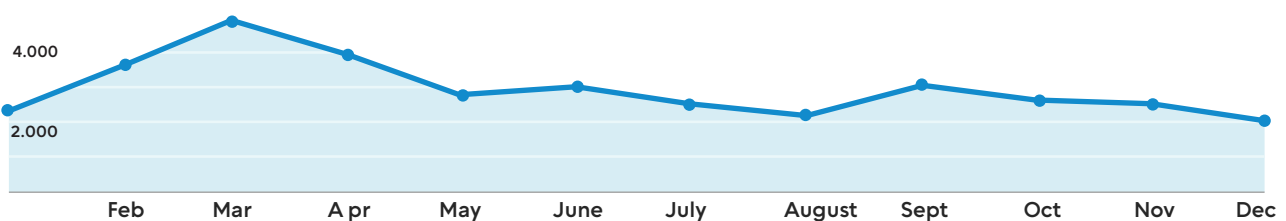
Analytics <https://www.biru.or.id>  
**www.biru.or.id**

### Overview

Jan 1, 2021 - Dec 31, 2021

All Users  
100.00% Pageviews

Sessions  
6.000



Sessions

**36,632**

Users

**29,287**

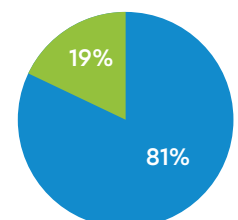
Pageviews

**52,774**

Page/Sessions

**1.48**

New Visitor Returing Visitor



Avg Sessions Duration

**00:01:24**

Bounce Rate

**78.43%**

% New Sessions

**81.85%**

Language	Sessions	%	Sessions
1. <a href="#">en-us</a>	11,881	<div></div>	33,34%
2. <a href="#">id</a>	9,657	<div></div>	27,10%
3. <a href="#">id-id</a>	9,653	<div></div>	27,09%
4. <a href="#">en-gb</a>	2,001	<div></div>	5,62%
5. <a href="#">en-ca</a>	845	<div></div>	2,37%
6. <a href="#">an</a>	286	<div></div>	0,80%
7. <a href="#">zh-en</a>	154	<div></div>	0,43%
8. <a href="#">en-au.html</a>	93	<div></div>	0,26%
9. <a href="#">en-in</a>	59	<div></div>	0,17%
10. <a href="#">de-de</a>	58	<div></div>	0,16%

Chart 9. Data of website visitors

The data above shows the number of sessions of the website visitors during 2022 has reached 35,632, of which 29,287 users or 81.9% were new visitors and 18.1% were visitors who had previously visited the website. Based on the language most frequently used by visitors in accessing the website, visitors who use English are 11,881 sessions or 33.34%, followed by the visitors who use Indonesian as many as 9,657 sessions or 27.10%. The data showed that most of the website visitors were from outside Indonesia. This of course can be considered as an opportunity for promotion and campaign activities in the context of developing partnerships or collaborations with prospective donors or consortiums.

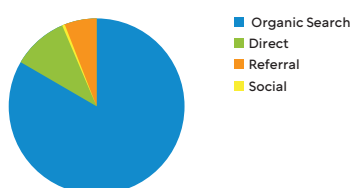
Analytics <https://www.biru.or.id>  
[www.biru.or.id](https://www.biru.or.id)

#### Acquisition Overview

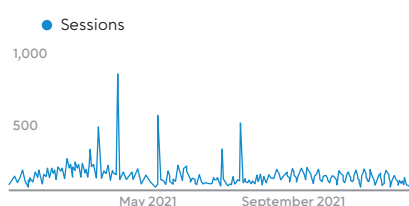
☒ All Users  
100.00% Sessions

Jan 1, 2021 - Dec 31, 2021

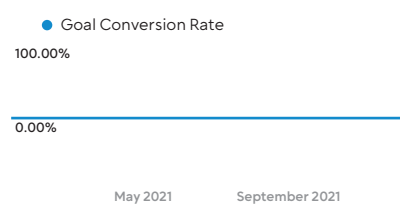
#### Top Channels



#### Sessions



#### Conversions



	Acquisition			Behavior		
	Sessions	%New Sessions	New User	Bounce Rate	Pages/ Sessions	Avg. Sessions Duration
	35,632	81,85%	29,164	78,43%	1,48	00:01:24
1 <input checked="" type="checkbox"/> Organic Search	29,697	<div></div>		82,74%	<div></div>	
2 <input checked="" type="checkbox"/> Direct	3,733	<div></div>		80,71%	<div></div>	
3 <input checked="" type="checkbox"/> Referral	2,047	<div></div>		12,26%	<div></div>	
4 <input checked="" type="checkbox"/> Social	155	<div></div>		71,61%	<div></div>	

#### Conversions



#### Set up a goal.

To see outcome metrics, define one or more goals.

GET STARTED

Chart 10. Data analytic of the type of website visitors and sources in accessing the website

## 2.4. COMMUNICATION ACHIEVEMENT

The infographic above shows that 83.3% of visitors have visited the website through organic search, 10.5% through direct search by typing “biru.or.id” on the search engine. Meanwhile, 6.2% of visitors have accessed the website through referrals and social or links listed on content from outside the website, such as from posts or articles uploaded on LinkedIn, Facebook, and other platforms.

### 2.4.2 Social Media

Social media is one of the communication channels that can be easily accessed by potential biogas enthusiasts and potential biogas investors or donors. Therefore, the existence of social media accounts to promote biogas is also important in order to reach varied parties. YRE's social media assets, i.e. Instagram, Facebook, Twitter, and LinkedIn, each of which has its own unique audience. Therefore, the approach taken is different for each platform. On YRE's Instagram and Facebook, audience demographics have some similarities and tend to have similar characters, but the types of interactions that exist on YRE's Instagram and Facebook have differences. On the Instagram platform, audience interactions are more related to submissions and collaboration offers, event information, and event invitations. While on the Facebook platform, the interaction is more likely to ask questions about biogas technicalities, such as how or what is needed to build biogas, biogas repair, biogas filling technique for filling biogas with animal manure, and biogas maintenance.

Meanwhile, on the Twitter platform, communication tends to be one-way. The interactions that have been built have not become discussions or continuous interactions, but are only limited to liking and re-sharing the information through the likes and retweet features.

For example, invitations of proposal submission, event invitations, collaboration proposals, including technical discussions related to biogas with several foreign audiences. Below are the details of the results of the activities of YRE's social media platforms:



During 2021, promotions and campaigns through YRE's Instagram content publication were carried out with indirect promotion approach or through the informative and educative content. This sort of approach is carried out in connection with the YRE entity as a non-profit organization and in line with IDBP which is oriented towards community empowerment in promoting energy and food independence.

Jangkauan Instagram ⓘ

438.989 ↑ 56,3%

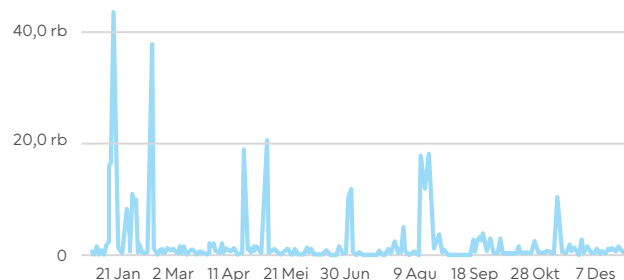


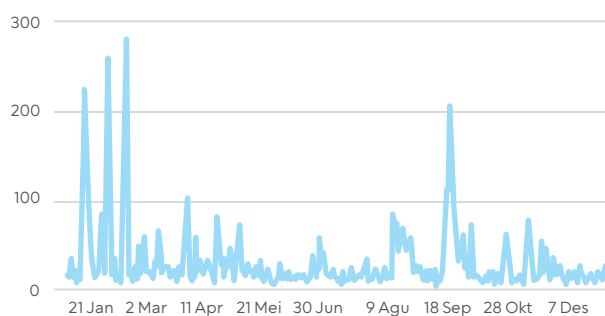
Chart 11. Data analytic of YRE's Instagram engagement

The highest reach achieved during 2021 was 438,989 accounts or 56,3% which increased from the previous trend. The highest reach occurred in January which reached more than 400 thousand accounts with the average reach was 200 thousand accounts during the year of 2021. At the beginning of 2021, it gained momentum to recover after a critical period during the COVID-19 pandemic.

Discourses related to the transition to renewable energy strengthened along with the emergence of various studies on reducing pollution due to the lack of human activity to go outside and considerations for starting a "new normal" with an environmentally friendly lifestyle.

#### Kunjungan Profil Instagram ⓘ

**10.237** ↑82,6%



**Chart 12. Data analytic of the number of YRE's Instagram visitors**

The highest Instagram profile visits in 2021 has reached 10,237 accounts or 82,6% which increased from the previous trend. The highest visits occurred in January, February, and September. This was related to the several activities organized by YRE during these months, such as webinars, workshops, and focus group discussions.

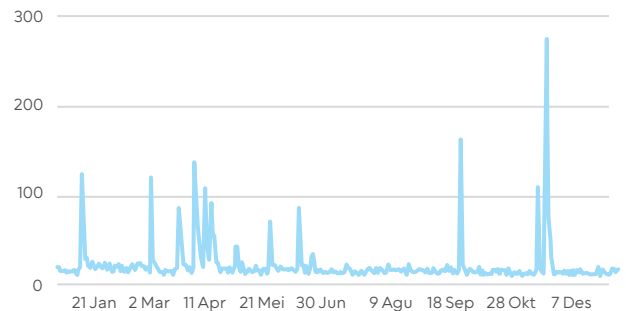


Published content on the Facebook page of BIRU was informative and educative. The type of approach used was similar to Instagram content and aimed to share the information and the success stories of biogas users who have applied biogas technology including bio-slurry as its derivative product. Promotion through content about sharing the success stories is one of the approaches that attracts the most attention and interest from the audience.

#### Hasil

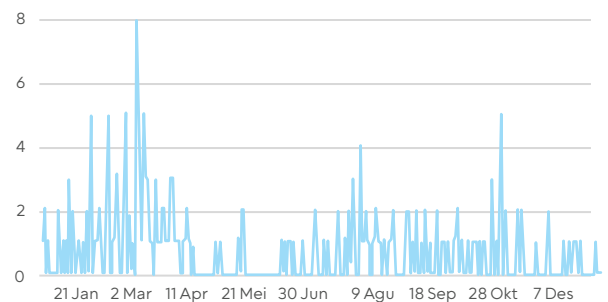
##### Jangkauan Halaman Facebook ⓘ

**3.201** ↑73,8%



##### Halaman Facebook Suka Baru ⓘ

**258** ↑73,2%



**Chart 13. Data analytic of BIRU's Facebook page engagement**

Based on the data above, the page reach that was successfully achieved was 3,201 accounts or showed an increasing trend of 73.8% with the highest reach in November 2021. Meanwhile, the page visits also showed an increase of 912 accounts or 26.8% with the highest visit in February. New visitors who liked the page reached 258 accounts or 73.2% with the most visitors pressing the like button on the BIRU's Facebook page occurred in March. The momentum in March was the One Decade of IDBP event, where participants who attended the event accessed registration, one of which was through the post on the BIRU's Facebook page.

## 2.4. COMMUNICATION ACHIEVEMENT

### Pemirsa

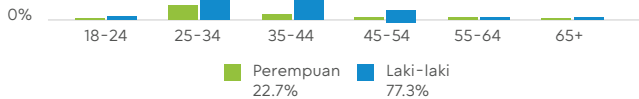
#### Pemirsa Saat Ini

Pemirsa Potensial

Suka Halaman Facebook ⓘ

6.924

Usia & jenis kelamin ⓘ



#### Kota Populer

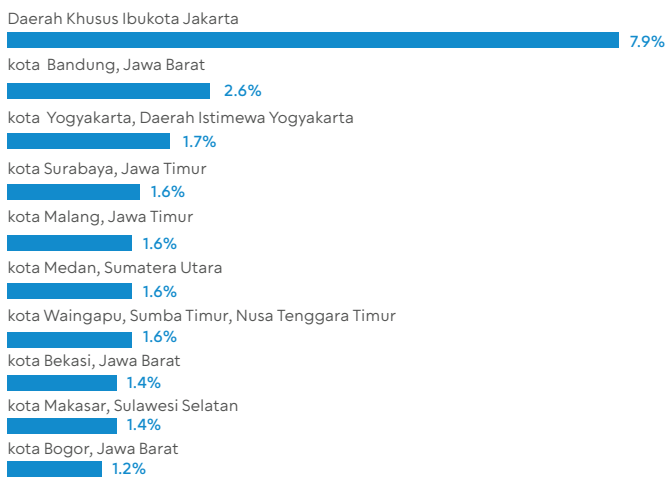


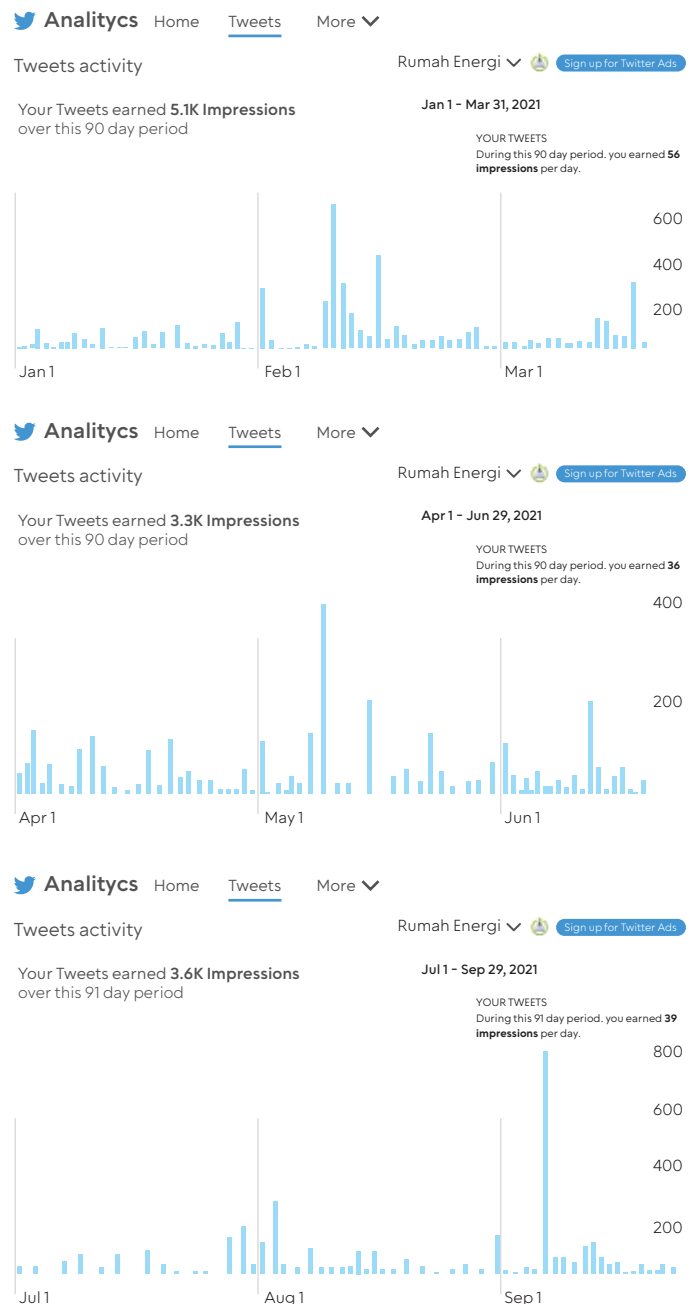
Chart 14. Data analytic of BIRU's page visitors and visitors' location

The data above shows the latest visitors, 6,924 visitors have liked the BIRU Facebook page with the most age range between 25-34 years, consisting of 22.7% were women and 77.3% were men, and the most popular city from which visitors came from was DKI Jakarta province with a percentage of 7.9%. The data also showed that visitors who came from the same cities as the biogas beneficiaries were located, such as Bandung, Yogyakarta, Surabaya, Malang, and Makassar have started to be connected to the BIRU's Facebook page.



Twitter

Audience interaction on the YRE's Twitter platform was more one-way and not massive. The interactions that had been built had not become discussions or continuous interactions, but were only limited to liking and re-sharing the information through the likes and retweet features. This is shown as in the infographic below:



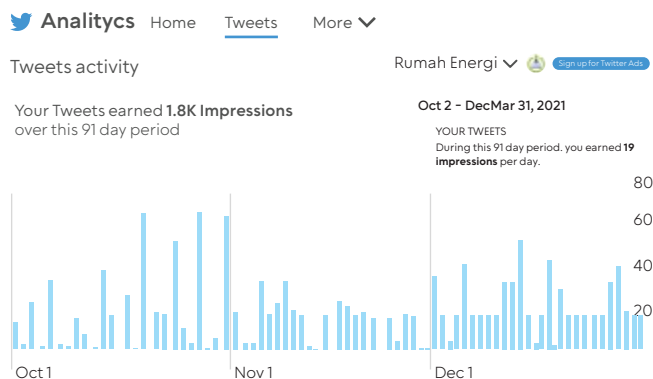


Chart 15. Chart of tweets' impression on YRE's Twitter

## LinkedIn

LinkedIn is a new platform optimized by YRE in 2021 and aims to introduce YRE's work including technology development and used for biogas marketing which targets parties who have the potential to build strategic partnerships with YRE. The LinkedIn platform has had a pretty good impact on YRE in expanding its reach and network. In contrast to other platforms such as Instagram, Facebook and Twitter, on LinkedIn platform YRE targets international audiences so that the language used in the content posts is English.

Visitor highlights		
285 Page views ▲ 738.2%	92 Unique visitors ▲ 736.4%	11 Custom button clicks

### Visitor metrics

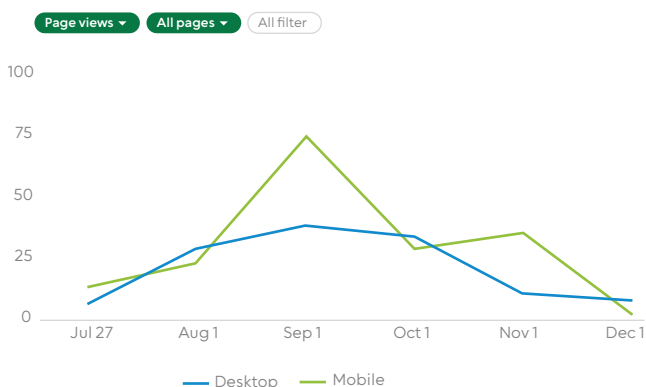


Chart 16. Chart of YRE's LinkedIn engagement

Based on data collected in the second semester of 2021, YRE's LinkedIn profile page views have increased by 285 visits, with 92 unique visitors. This showed that there was an increased awareness of YRE, especially the promotion and campaign activities of the IDBP.

## 2.4.3 Event

### Live Instagram

- The Strategic Role of Agriculture in Climate Change Mitigation



In early 2021, Indonesia was recorded to have been hit by several disasters in a number of regions. One of the most highlighted factors is the phenomenon of climate change which causes rising sea levels and high rainfall, not to mention the Covid-19 pandemic which has not subsided yet. The discussion through the Live Instagram platform with Her Sanyoto, Head of TaniAcademy by Tanihub, discussed the strategic role of agriculture in Indonesia's food supply chain, the challenges faced by farmers, and how technological interventions address existing problems.



## 2.4. COMMUNICATION ACHIEVEMENT

- Celebrating the National Waste Awareness Day



February 21<sup>st</sup> is the date to celebrate the National Waste Awareness Day. YRE in collaboration with Sustainable Indonesia shared the respective good practices in efforts to overcome waste problems in Indonesia. This collaboration also aimed to share inspiration with the audience about waste management that could be done starting from the smallest scope such as form ourselves.

### Webinar

During the COVID-19 pandemic, discussion events were held through webinars. The webinar activities were intended to share knowledge as well as to carry out soft branding efforts for the IDBP to the public in introducing technology, cooperation schemes, including financing models under the IDBP.

Several webinar activities were held, including the webinar “*Membangun Diskusi Konstruktif untuk Permasalahan Pupuk di Indonesia* (Establishing Constructive Discussions on Fertilizer Issues in Indonesia) which delivered issues-

of national food security and agricultural productivity in Indonesia, and its relation to unequal fertilizer subsidies. In this webinar, bio-slurry was stated to be an alternative to dependence on subsidized fertilizers. Two other webinar series, namely the webinar *Koperasi sebagai Agen Perubahan dalam Pembiayaan Mitigas dan Adaptasi Perubahan Iklim* (Cooperatives as Agents of Change in Financing Climate Change Mitigation and Adaptation) and the webinar *Membuka Akses Pembiayaan Aski Perubahan Iklim di Tingkat Tapak* (Providing Financing Access on Climate Action to the Grassroots Level) discussed financing as one of the important pillars in climate change adaptation and mitigation efforts.





These webinars were part of the soft-selling biogas marketing strategy by introducing biogas derivative products such as bio-slurry as well as by promoting biogas as an alternative solution for the transition to renewable energy as an effort to mitigate climate change. Participants who attended the webinar on average reached 100 people came from various backgrounds, such as members of cooperatives, civil society organizations, students, private workers, and the general public.

## One Decade of IDBP



One Decade of IDPB, an event that was dedicated to mark the achievement of the installment of more than 25,000 biogas units in Indonesia with beneficiaries reaching around 120,000 people under the implementation of IDBP. This event was held on 23 and 24 March 2021 with a hybrid method presenting stakeholders involved in achieving the biogas sector development, such as MEMR, Hivos, and some collaborators.



## 2.4. COMMUNICATION ACHIEVEMENT

### 2.4.4 Collaboration

#### Climate Change Public Discussion: *Bumi dan Manusia* (Earth and People)

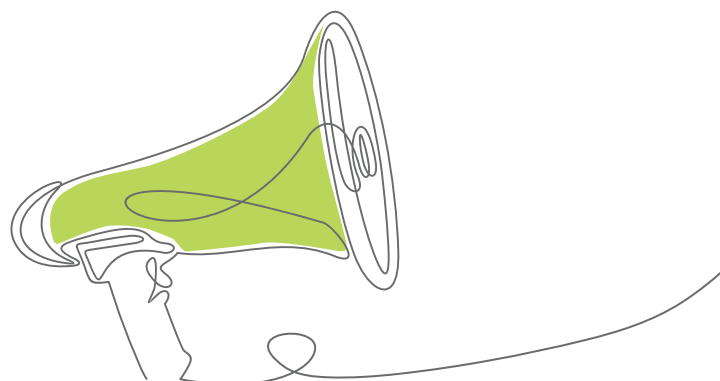


YRE had an opportunity to trigger the public discussion on the topic of climate change. The event was entitled *Diskusi Publik Perubahan Iklim: Bumi dan Manusia* (Climate Change Public Discussion: Earth and People) that shared stories about saving the environment and climate. YRE was represented by Rebekka Angelyn, YRE's Executive Director, who shared nine years of YRE's experience and lessons learned about the IDBP. This discussion activity was organized online by Tempo Institute.

#### APEC Workshop



MEMR organized an event entitled APEC Workshop on Achieving Business Sustainability for Clean Energy Start-ups that presented international clean energy and fiscal experts. On this occasion, YRE was represented by Rebekka Angelyn, YRE's Executive Director, as one of the speakers who explained how biogas has become a part of sustainable business development.



## Indonesia's Future with Electrifying Agriculture



Indonesia's Future with Electrifying Agriculture: Challenges & Opportunities was an online discussion forum organized by YRE in collaboration with SUN Energy that aimed to figure out the achievements of renewable energy utilization, especially in the agricultural sector and how this would contribute to realizing Indonesia's zero carbon emission target by 2060. In this event, YRE gave Mukhlis Khairi an opportunity representing KUD Sumber Makmur, Ngantang, Malang Regency to be a resource person who explained the contribution of biogas and its derivative products, specifically bio-slurry to the business development of cooperative members who also work as dairy farmers.

## 2.4.5 Promotional Materials

### Bio-slurry Brochure

In the IDBP's promotional and campaign activities, aside from soft-selling efforts through the website, social media, and various events, YRE also produced brochures for direct selling. In 2021, YRE produced bio slurry brochures which were used to promote biogas from the point of view of the advantages of running bio-slurry production for biogas users.



## 2.5. IMPACTS ALIGNMENT TO SDGs

The impacts of IDBP are aligned with several SDGs' targets. The impacts are measured through the IDBP annual survey, the Biogas User Survey (BUS). The BUS is an important instrument to assess users' satisfaction rate towards biogas, evaluate the technical performance of the biodigester, and its results are used as a source of annual carbon monitoring. Herewith the five goals of SDGs that are aligned with the IDBP's impacts in 2021.

### SDG 1 - No Poverty

After using biogas, YRE noticed the number of farmers using firewood and kerosene for cooking has decreased significantly. The decreasing number of firewood and kerosene users by reason of using biogas corresponds to a lower fuel cost. Comparing fuel cost to total monthly expenses, around IDR 70,000 is saved for firewood fuel, while around IDR 80,000 is saved for kerosene fuel.

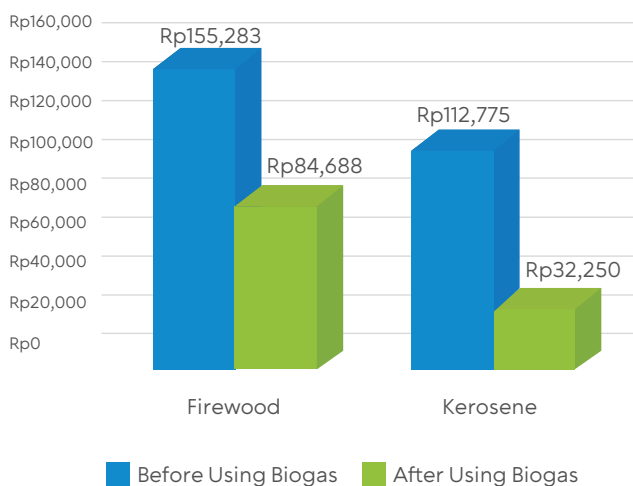


Chart 17. Fuel cost comparison before and after using biogas

Amount of money saved from fuel cost are mostly exchanged to fund household living costs, while others may also use it for school tuition fees, savings and working capital. Only a few of our users use the savings for social activities and private (women) needs.

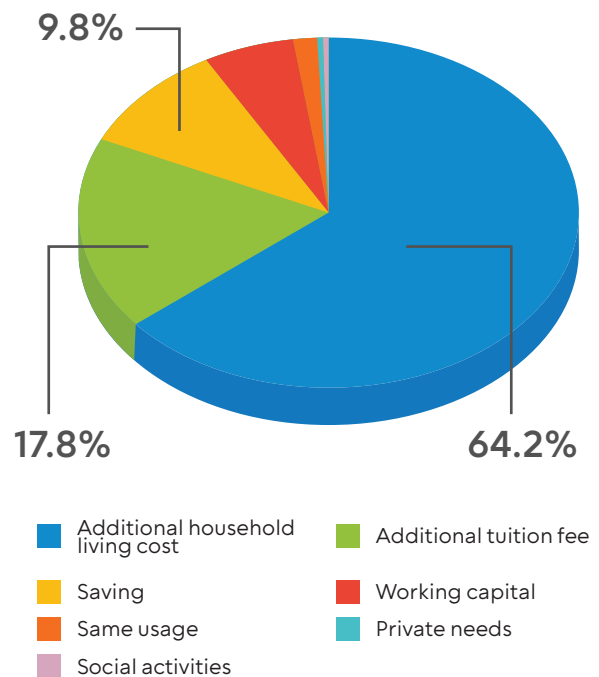


Chart 18. Utilization of saved money from fuel reduction

As a part of the biogas value chain, bio-slurry (organic fertilizer produced from the biogas process) is utilized by the farmers to gain more income or save monthly cost. The average income obtained from selling bio slurry is around IDR 422,708 per farmer. Around half of our users used the bio-slurry for themselves and gave an impact on decreasing the usage of chemical fertilizers, which promotes increasing the amount of monthly saving cost for our users.

### SDG 2 - Zero Hunger

Healthy soils are the primary basis for healthy food production because soils are where the food begins. It supplies the essential nutrients that the food-producing plants need to grow and flourish. Maintaining a healthy soil is highly linked to food security and nutrition for human health. We acknowledge that the biogas process which produces dregs called "bio-slurry" gives various advantages for more sustainable agriculture.

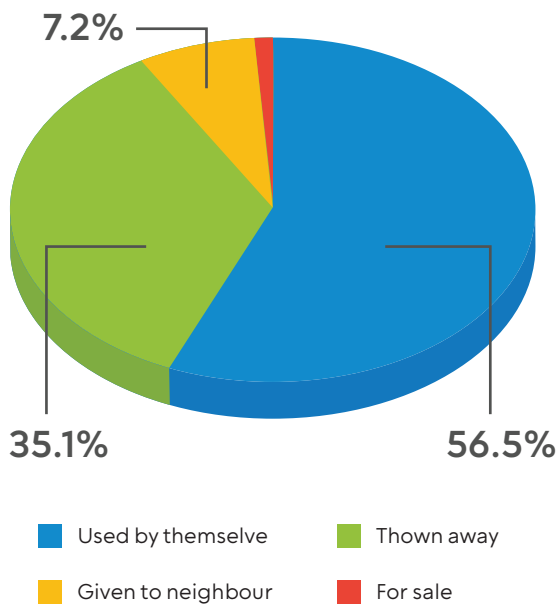


Chart 19. Bioslurry Usage by farmers

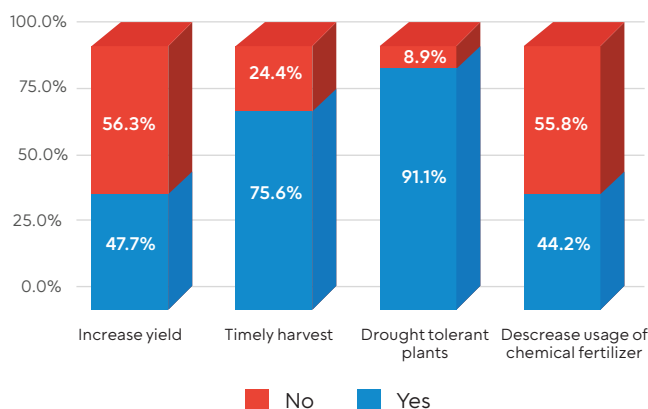


Chart 20. Benefits from Bioslurry Usage

Bio-slurry as the by-products of the biogas process is used by around 50 - 63% of biodigester users. About 40% of farmers in the survey stated that their yield production increased after applying bio-slurry as organic fertilizer. Most of the farmers benefit from a timely harvest period and healthier plants by using bio-slurry. Around 70% of farmers said that it didn't take longer to harvest when they used bio-slurry. Some of the farmers also mentioned a decreasing use of chemical fertilizer due to bio-slurry utilization. Soil structure is also improved to capture and hold water, making the plants using bio-slurry more drought tolerant.

## SDG 5 - Gender Equality

Although women involvement in the decision making process, training, and biogas maintenance is shown lower than men, women are considered as the highest beneficiaries of biogas installation. Our respondents who claimed that women family members are the highest beneficiaries from biogas are three times higher compared to the men family members beneficiaries. It is undoubtedly precise, as biogas utilization is closely related to domestic work or cooking activities for the family.

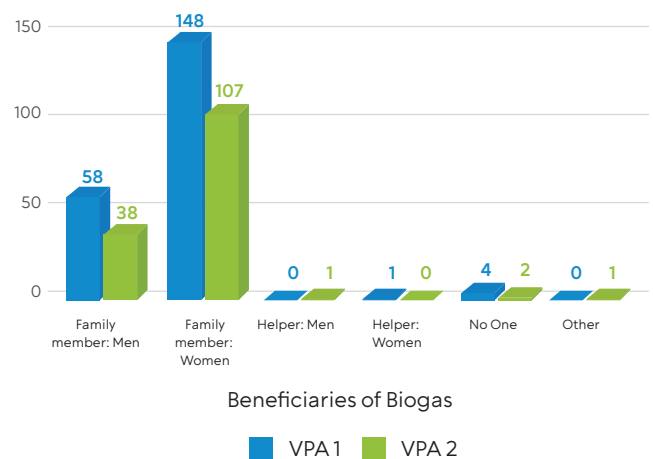


Chart 21. Perception on biogas beneficiaries recipient

Biogas provides direct benefit to groups of rural women by reducing their workload. Having more free time available to be used for other activities is one of the advantages that around 65 - 68% women users get. Free time is mostly used for leisure, taking care of their family, and social activities, while a few others may use it for entrepreneurship.



## 2.5. IMPACTS ALIGNMENT TO SDGS

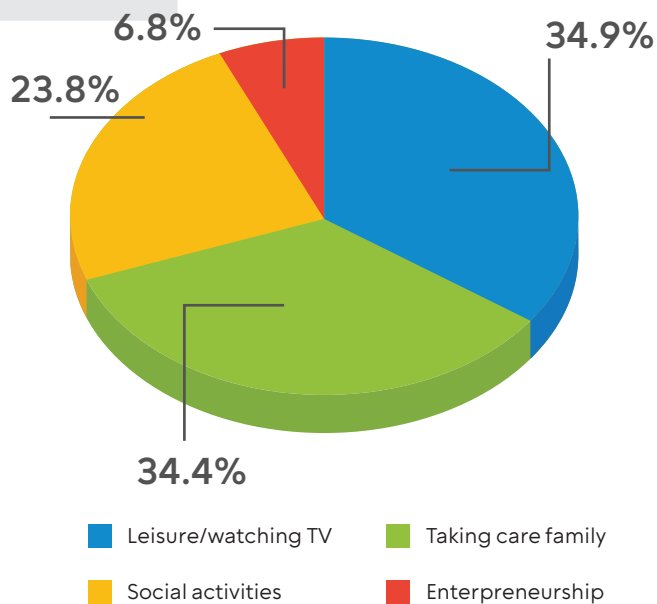


Chart 22. Free time optimization by women beneficiaries

Women's pivotal role in household financial management is also shown in our survey. When the household is able to save money from biogas utilization, around 82% of respondents stated that women family members and mothers are the ones who manage the money. These findings reflect that biogas promotes gender equality in terms of household management and women empowerment for their domestic or other kind of activities.

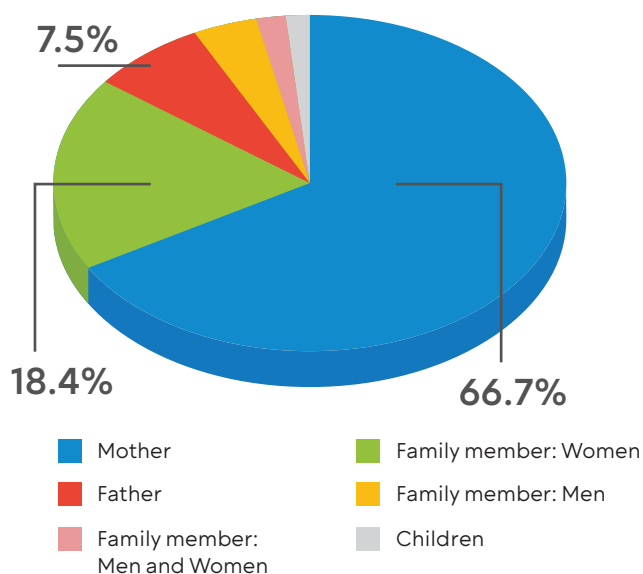


Chart 23. Responsible person for managing saving money from biogas

### SDG 13 - Climate Action

There are robust positive impacts from biogas to inhibit climate change and global warming. Biogas combustion through the conversion of methane into carbon dioxide has a positive effect on greenhouse gas (GHG) emissions. It reduces methane emissions from improved manure or waste management. Until December 2021, biogas installation and utilization through IDBP helps reduce **394,294 tons of carbon dioxide equivalent (tCO<sub>2</sub>e) of GHG**.

Change of fuel usage found in our survey is 46,7% decreased for firewood and 71,7% decreased for kerosene. By supporting the transitioning away from biomass fuels, biogas contributes to deforestation prevention. An average family size of biogas plants is considered to save more than 2 tons of fuel wood per annum. It indirectly promotes soil fertility and yields, also minimizes slash and burn practice or other land-use change activities that generate negative impacts on climate.





# BIO-SLURRY VALUE CHAIN

## 3.1 Bio-slurry Support Facility (BSF)

In December 2020, two CPOs were chosen to receive support facility for bio-slurry business. They were CV. Rizki Abadi in South Sulawesi and KUD Sumber Makmur in East Java. The selection was based on due diligence and recommendation of YRE provincial team. Precondition of CPO is that they already run abio-slurry business and has (in-kind) contribution to their own business.

The KUD Sumber Makmur was chosen due to several reasons, namely: (i) numbers of cooperatives member who are also biogas users; (ii) capabilities in financial management and organization management including their periodic report; (iii) ownership of temporary storage room for bio-slurry. On the other hand, CV. Rizki Abadi was chosen due to: (i) its capabilities in financial management and organization management; (ii) already has existing bio-slurry products in the niche market; (iii) has board market in Makassar and its surrounding areas; (iv) already has tested their bio-slurry products in laboratory using its own resources; and (v) already temporary storage room for bio-slurry.

The Bio-slurry Support Facility (BSF) was a financing facility that provided grants to the CPOs to help them expand their liquid and solid bio-slurry business. There were several key interventions designed for the CPOs for their bio-slurry business: provision of storage facility, processing equipment, mandatory permits, and lab tests to increase their products quality and market outreach.



Picture 6. Bioslurry production by KUD Sumber Makmur in East Java



Picture 7. Bioslurry products by CV. Rizki Abadi in South Sulawesi

In January 2021, YRE held a discussion with the Ministry of Cooperatives and MSMEs regarding support from the Ministry of Cooperatives in providing recommendations for the registration process for bio-slurry brand permits produced from the two CPOs. The issuance of a letter of recommendation from the ministry would be able to reduce the bio-slurry brand permit registration cost. The ministry then provided recommendations for both CPOs to register their brand permit to The Ministry of Law and Human Rights of Indonesia and to conduct two laboratory tests (general bio-slurry test and quality/effectiveness test). By doing those, each CPOs were expected to obtain the distribution permit.

### 3.1. Bio-slurry Support Facility (BSF)



Picture 8. Stakeholder meeting with the Ministry of Cooperatives and MSMEs

Since the beginning, the information obtained by CV. Rizki Abadi and KUD Sumber Makmur mentioned that biofertilizer registration could only be done online through online i.e. <http://perizinan.pertanian.go.id>. However, after 1 year, only CV. Rizki Abadi who was able to acquire a brand permit. On the other hand, the registration application status of the Sumber Makmur KUD has not changed from the status of "Inspection Stage".

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Lampiran 2 (MEL) Page 1 of 1

No. Urut	Parameter	Nilai Hasil	Metode Pengujian
1	pH	5.18	KCPO-41.0779110 (Kuantitatif)
2	P <sub>2</sub> O <sub>5</sub> , %	0.002	KCPO-55.0779110 (Spektrofotometri)
3	K <sub>2</sub> O, %	0.18	KCPO-65.0779110 (AAS)
4	C-Organik, %	0.47	KCPO-36.0779110 (Gravimetri)
5	N-Organik, %	0.09	KCPO-25.0779110 (Gravimetri)
6	pH	14.08	KCPO-15.0779110 (AAS)
7	Fe, ppm	71	KCPO-05.0779110 (AAS)
8	Mn, ppm	71	KCPO-15.0779110 (AAS)
9	Pb, ppm	8.02	KCPO-05.0779110 (AAS)
10	Cu, ppm	71	KCPO-05.0779110 (AAS)
11	Cr, ppm	20.40	AAS
12	Co, ppm	71	AAS
13	Mo, ppm	71	AAS

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LAPORAN HASIL PENGUJIAN  
Nomor : 086/027/LT/3/2021

Nama / Pemohon : 1 M. Sugito  
Instansi : 1 KUD Sumber Makmur  
Alamat : 1 Jl. Raya Watunaja 21, Watunaja, Ngantang 65132  
Jenis Sampel : 1 Pupuk Organik  
Uraian Sampel :  
- Jenis : 1 Batsir  
- Kode Sampel / Merek : 1 -  
- Volume : 1 1.000 g dalam kemasan kantong plastik  
Tanggal Pengiriman : 1 3 Februari 2021  
Tanggal Pengujian : 1 8 Februari s.d 4 Maret 2021

Laporan hasil pengujian ini diberikan dengan tujuan yang bersifat informatif dan tidak dapat digunakan untuk keperluan lain yang berkaitan dengan hukum.

No.	Parameter	Nilai	Satuan	Metode
1	C-Organik	26.50	%	Pengapukan kering 550 °C (*)
2	C <sub>tot</sub>	24.78	%	Pengapukan
3	Carb. tot	25.71	%	Gravimetri (oven 105 °C)
4	Asam Organik	1.81	%	Kuantitatif, Titrimetri
5	pH	5.13	%	Gravimetri (HClO <sub>4</sub> /HClO <sub>3</sub> ) Spektrofotometri
6	pH	5.42	%	Gravimetri (HClO <sub>4</sub> /HClO <sub>3</sub> ) Spektrofotometri
7	pH	5.2	%	Gravimetri (HClO <sub>4</sub> /HClO <sub>3</sub> ) Spektrofotometri
8	Asam Organik	0.31	%	Pengapukan

Nilai yang tertera dalam laporan ini adalah nilai rata-rata dari tiga kali pengujian.

(\*) Metode analisis kering oven 105 °C

Makassar, 5 Maret 2021  
Makassar, 5 Maret 2021  
A. A. Pratiwi, SPT, M. Sc.

Picture 9. Laboratory test of CV. Rizki Abadi's bio-slurry

Simultaneously, CV. Rizki Abadi and KUD Sumber Makmur Ngantang have independently conducted lab tests on the bioslurry produced to see whether from the results of the lab test, the content of each bioslurry produced complies with the provisions of the Ministry of Agriculture. From these tests, it was found that solid bioslurry produced by KUD Sumber Makmur met the requirements of the Ministry of Agriculture. Meanwhile, liquid bioslurry produced by CV. Rizki Abadi was not suitable, so the quality should be improved.



### 3.2 YRE as bio-slurry off-taker

Based on Biogas User Survey 2020, it was found that only 62% of bio-slurry users from total of biogas users and only 3% sell bio-slurry. Since the beginning of the BIRU program, YRE has carried out various promotions related to the benefits of bio-slurry and how users can get additional income from selling bio slurry. However, the problem faced by users so far is the lack of interest in bio-slurry.

Based on the calculation of the BEP for biogas development, new biogas users will reach the BEP value in the 10th year. It's different if the user also sells bio-slurry, then in the 3rd year it has reached the BEP value. From these several things, YRE decided to become a bio-slurry offtaker. This apart from aiming to encourage biogas users to take advantage of bio-slurry, it also aims to increase the biogas market because biogas has added value apart from gas.



Picture 10. Bio-slurry business model

In October 2021 YRE approached four cooperatives in East Java, namely KUD Tani Wilis, KUD Sumber Makmur, KAN Jabung and KPSP Setia Kawan to discuss YRE's plan to become a bio-slurry offtaker. This was welcomed by them even though from the four cooperatives only KUD Sumber Makmur has started the bio-slurry business. Furthermore, from the meeting in October 2021, the four cooperatives could start calculating prices and procedures for collecting bio-slurry from biogas users who are members of the cooperative while YRE prepares registration of companies that will carry out the business.



Picture 11. Meeting with several cooperatives for bio-slurry business development

# 4 GOLD STANDARD CARBON CERTIFICATION

From the onset it has been the intention for the IDBP to seek carbon financing to ensure the long-term (financial) sustainability of the program. IDBP feasibility study in 2008 mentioned that carbon finance is identified as an additional source of finance that makes the program more financially attractive. Originally, Hivos decided to use Gold Standard Certified Emission Reduction (GS CERs) as this would comply with KfW's priorities. KfW had approved to finance the carbon mechanism development. In October 2011, KfW decided to withdraw the support as they foresaw that the registration process not done before the end of 2012. Hivos then decided to take over the financing and shifted to Gold Standard Verified Emission Reduction (GS VERs) since Hivos has succeeded to the first domestic biogas project in South East Asia by Gold Standard under voluntary track (the Cambodia National Biodigester Program). In 2013, IDBP was registered as a Voluntary Gold Standard Program of Activities.

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 the Monitoring Reports period 8 of VPA1 and period 3 of VPA 2 Indonesia Domestic Biogas Program which have been approved by Gold Standard, annual emission reduction from one unit of bio digester unit is 2.56 tCO<sub>2</sub>e. 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. Since 2013 YRE had been involved in the development, monitoring, evaluation and assisting the Biogas User Survey (BUS) annually. And since 2021 the management of carbon credits of IDBP has been transferred YRE. In 2021 the verification was conducted by Tuv Nord, one of the agencies accredited by CDM and Gold Standard.

The carbon funds are pumped back into biogas activities through YRE. 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 donors.



# 5 CHALLENGE & LESSON LEARNED

1. The absence of CPOs and construction materials in some areas has forced mobilization of mason groups and construction materials from other areas. This led to an increased price, making biodigester more expensive in those new areas. **Mitigation:** Cooperating with local institutions or companies to develop biogas programs in new areas as well as training for local mason groups. One successful example was the biogas development program in Gorontalo in collaboration with the LTKL.
2. Lack of commitment from the large-scale cooperatives that were selected as MFI partners to provide funding/loan for small-scale local cooperatives. **Mitigation:** Continue to provide intensive and periodic assistance to MFI partners in loan provision to smaller-scale cooperatives.
3. The sluggish market for BioMiRu in several provinces due to lack of persistence of CPOs in handling malfunctioning cases especially leakage. **Mitigation:** Intensive sharing session between partners in WhatsApp group or through CPO gathering session to disseminate best practices in operational and maintenance of BioMiRu e.g. leakage cases.
4. Low quality of numbers of constructed biodigester by local CPOs. **Mitigation:** Provision of reprimanding letter to CPO with poor development quality and provide refresher session on IDBP biodigester quality standards and further intensification of biodigester quality checks for all CPO.
5. Low number of bio-slurry sales by users and CPOs due to uninformed farmers on the benefits of bio slurry application. **Mitigation:** YRE becomes a bio-slurry offtaker to help users selling their bio-slurry







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