



su-re.co
Sustainability & Resilience



The 5.2 Sustainability and Resilience Workshop

Clean Energy Transition & Land Use Based Mitigation in Indonesia

Open Government Week

Zoom Webinar, 20th May 2021

Speakers



Dr. Takeshi Takama

CEO & Founder
su-re.co

*"Introduction to
su-re.co's projects"*



Ir. Arif Wibowo, M.Sc

Directorate of Climate
Change Adaptation
Ministry of Environment
and Forestry

*"The Role of NGO in
Climate Change
Adaptation Efforts"*



Cynthia Ismail

Research Assistant
su-re.co

*"Transformative
Narratives in Clean
Energy Transition"*



Siti Indriani

Research Assistant
su-re.co

*"Land-based Mitigation
Technologies and
Practices"*



Fabian Wiropranoto

Research Assistant
su-re.co

*"Biogas Initiative funded
by Carbon Offset with
Blockchain"*

Moderator



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REPORT

Prepared by
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Executive Summary

There is increasing attention to climate change globally, including in Indonesia. To support Indonesia's efforts in addressing climate change, su-re.co organized workshop of their ongoing projects. Currently, there are three main projects; Firstly, LANDMARC (2020-2024) aims to identify land-use-based climate change mitigation. TIPPING+ (2020-2023), aiming to find the possible tipping point in moving towards the use of clean energy, and finally, IKI Small Grants (2021-2022) aims to create a carbon offset scheme using biogas and blockchain technology. As a follow-up to the previous Kick-off Workshop 5.1 on March 2021, su-re.co co-hosted the Open Government Week (OG Week) 5.2 Sustainability and Resilience Workshop with the European Commission partners and the Indonesian Government.

Through the 5.2 Sustainability and Resilience Workshop, su-re.co aims to strengthen the communication and collaboration between stakeholders. This event was held on 20 May 2021, attended by 99 participants representing policymakers, research institutes, universities, and the public. Through the Focus Group Discussion (FGD), su-re.co and the stakeholders had a profound discussion in finding potential activities to enrich mitigation actions through the ongoing projects. The TIPPING+ discussion summarized that supporting policy and market chain will foster the transition towards clean energy. On the LANDMARC discussion, the implementation of climate and land-use models in land-based mitigation actions was gathered for LMT narrative, such as WANULCAS (assessing the environmental impact of potential land use) and GENRIVER (impact potential land use to the riverine system). Besides, other land-use mitigation technologies (LMTs) that might be helpful in LMT narratives and co-design were furthered discussed. Moreover, potential collaborations within the IKI Small Grants Project were also discussed, such as promoting capacity-building and scientific outreach regarding blockchain for carbon offset validation and verification.

Collaboration between stakeholders is essential in addressing climate change adaptation and mitigation. Governmental agents, non-governmental organisations (e.g., educational institutions, research institutes) and private firms are important in changing mainstream narratives in clean energy transition and land-use mitigation in Indonesia. In addition to mitigation actions, NGOs can also participate in adaptation measures by organising activities to expand knowledge management and strengthen the local capacity. Thus, su-re.co's workshop serves two main purposes: 1) addressing every actor's role and 2) aligning each stakeholders' vision. Beyond the workshop, su-re.co intends to continuously contribute to the SDG movement in Indonesia and support the transition towards clean energy and the land-based mitigation actions.

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Abbreviation List

B

Balittanah
Soil Research Centre, 4
BAPPENAS
Ministry of National Development Planning, 4
BECCS
Bioenergy with carbon capture and storage, 4
BIG
Indonesia Geospatial, 4
BNPB
Indonesian National Board for Disaster Management, 7
BPS
Statistics Indonesia, 4
BPTP
Agricultural Technology Research Center, 10

D

Distanpangan
Agriculture and Food Security Services, 4

E

ER
Equivalence ratio, 10

G

GHG
Greenhouse gases, 1
GIS
Geographic Information System, 9
GIZ
Gesellschaft für Internationale Zusammenarbeit.

I

IKI
Internationale Klimaschutzinitiative/ International Climate Initiative, 1

K

KLHK
Ministry of Environment and Forestry, 4

L

LANDMARC
Land Use Based Mitigation for Resilient Climate Pathways. *See*
LAPAN
Institute of Aeronautics and Space, 4
LCDI
Low Carbon Development Indonesia, 7
LMT
Land-use Mitigation Technologies, 3

M

MEMR/ESDM
Ministry of Energy & Mineral Resources, 4

N

NDC
Nationally Determined Contribution goals, 7
NES
Negative emission solution, 4
NGO
Non-governmental Organizations, 6

P

PERTAMINA
Oil and Gas State-owned Company, 7
PLN
State-owned electricity company, 8

R

RDI
Resilience Development Initiatives, 10

S

SME
Small Medium Enterprises, 8

T

TIPPING+
European Commission Project on Enabling Positive Tipping Points towards Clean-energy Transition in Coal and Carbon Intensive Regions, 1

1. Introduction

1.1. Introduction of su-re.co Projects

By: Takeshi Takama (CEO of su-re.co)

Currently, there are three main focuses in su-re.co work: European Commission projects (LANDMARC and TIPPING+) and the Biogas Initiative project under IKI Small Grants by GIZ. One of the main concerns addressed with the projects is climate change. Indonesia, amongst other countries, had also shown the commitment to join the Paris Agreement to reduce carbon emission.

With the conservative scenario, Indonesia will experience an increase of temperature of one degree Celsius for the next one hundred years. Northern Indonesia will get more humid while the southern part would be dryer due to the temperature increase. Nonetheless, the GHG reduction is still possible. For instance, the emission decreased dramatically during the pandemic, up to 7% equals to similar to 15 years ago. Furthermore, a dramatic decrease in CO₂ was found in Bali on Nyepi Day (Silence Day), where activities outside the home are prohibited. Therefore, it is possible to reduce CO₂ emission up to 43%, exceeding the national target.

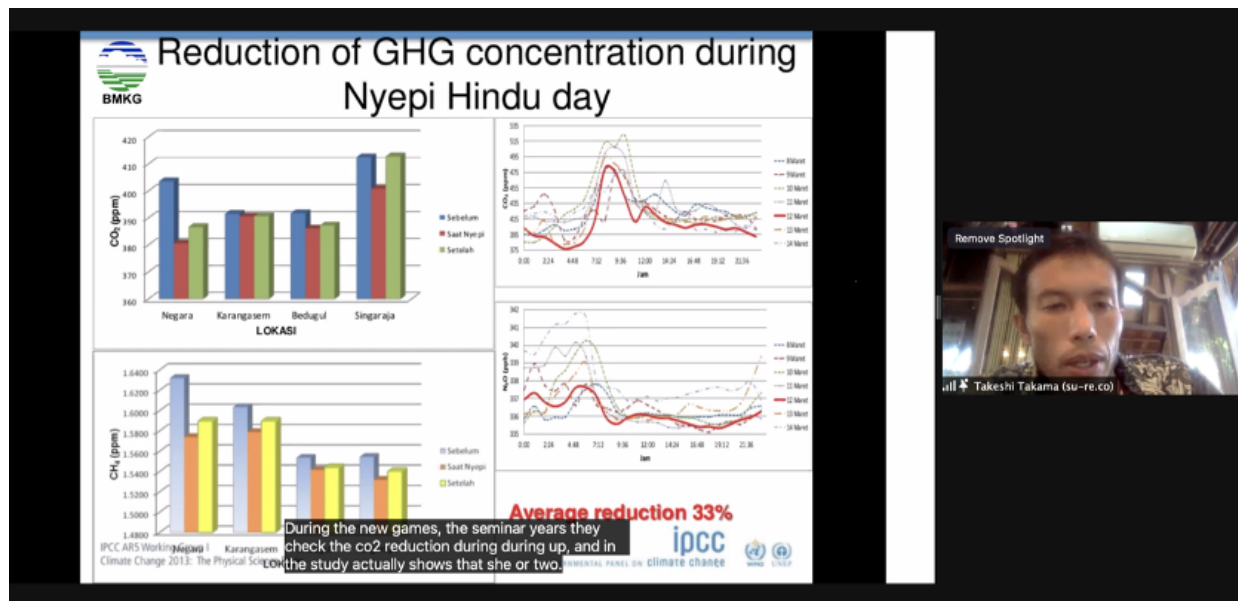


Figure 1 The GHG reduction on Nyepi Day in Bali

Finding the tipping point to change the current energy mainstream into a more sustainable alternative is one of the focuses of su-re.co under TIPPING+. Tipping phenomena were introduced in this session to anticipate a sudden shift of the current system in economic or biophysical trends (e.g., declining GHG emission and stock market). In particular, there is a question on how to reduce carbon emissions while ensuring Indonesia's development, given

Indonesia uses coal with high carbon emissions to supply the growing energy demand. As an alternative, su-re.co offers the installation of a biodigester for energy supply at the local level, which is the focus of LANDMARC and IKI Biogas Initiative. Furthermore, su-re.co has been actively advocating climate information to the communities through various programs such as the Climate Field School in collaboration with BMKG (Meteorological, Climatological, and Geophysical Agency).

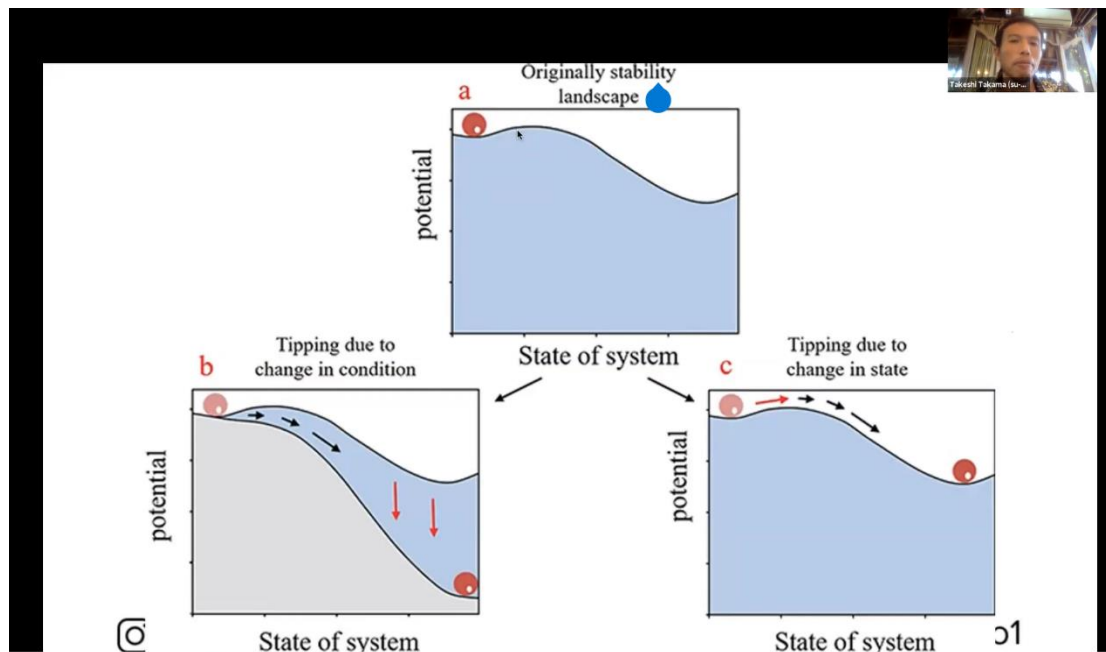


Figure 2. The introduction of tipping phenomena

As a “think-do-be” tank, su-re.co works on integrating scientific knowledge to the application of clean technology (e.g., biodigester), and sustainable business. Overall, the steps su-re.co takes to address the climate change: 1) frugal innovation for the society, 2) participating in a deep take to tackle social problems, and 3) working with advanced technology (blockchain, biogas, etc.). Together with the IKI Small Grants, su-re.co aims to reduce carbon offset cost in biogas through a blockchain system. Hence, this initiative can contribute to the TIPPING+ and LANDMARC projects. These three projects are expected to support Indonesia’s low-carbon development plan. Therefore, any overlapping activities can be identified and coordinated in this session as a starting point with the involved stakeholders.

1.2. Introduction to TIPPING+

By: Cynthia Ismail (su-re.co)

Coal is currently the main source of energy in Indonesia. As a case study, the research scope will focus on Banten and Bali context as these regions are connected by one interconnection

electricity grid. Banten is one of the backbones for meeting the electricity demand of the grid. At the same time, Bali that is projected to have rapid economic growth due to its tourism sector yet still relies on Java to power their electricity. The objective of the Indonesia case study under TIPPING+ is to understand how to move from the carbon-intensive fuels in the electricity and cooking fuel system towards alternative energy sources such as biogas. Eventually, the research aims to assess the effects of the interventions in an interdisciplinary manner that could potentially transform the current system into a low carbon orientation. This process is expected to identify what tipping points could accelerate the transformation process.

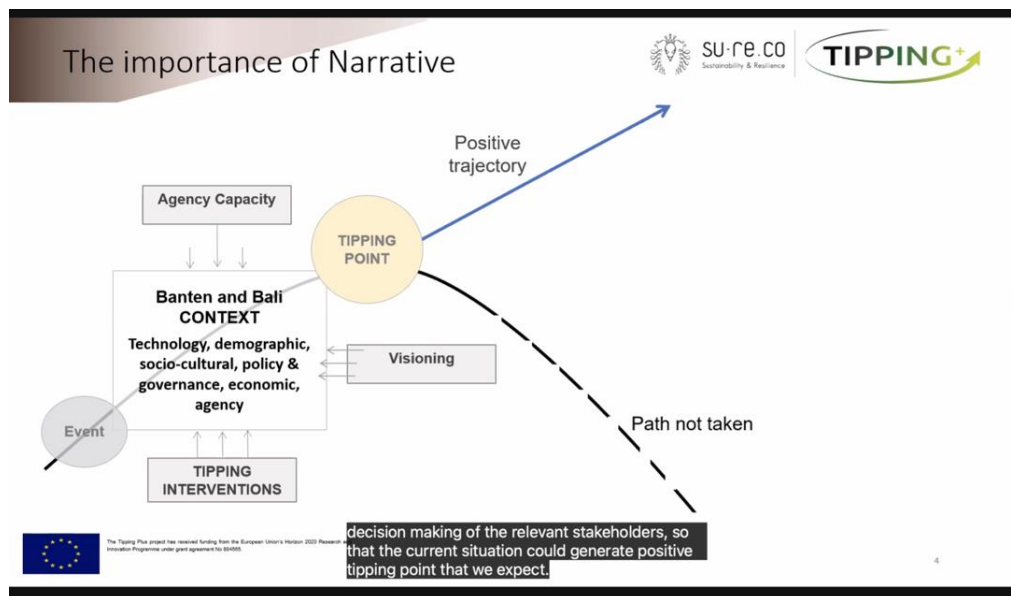


Figure 3. The importance of narrative in explaining how the tipping point for transformation

This project utilises narrative from the stakeholders' perspective to find the tipping intervention that could accelerate the transformation towards more sustainable energy use. This narrative encompasses understanding the historical energy, the stakeholder's capacities, and visioning for transformation. Thus, active participation from all stakeholders is essential. At the end of the project cycle, a socio-economic modelling will be carried out to assess the effects of tipping interventions. Ultimately, the project result intends contribute to the positive tipping point in the energy transition in Indonesia.

1.3. Introduction to LANDMARC

By: Siti Indriani (su-re.co)

LANDMARC Indonesia case study aims to understand the impact of LMT (land-use mitigation technologies) on potential land use alternatives. The research also assesses how each LMT can be upscaled to a bigger geographical range and the implication of upscaling the LMTs. Four

methodologies are used in this project: 1) stakeholders' engagement, 2) earth observations, 3) modelling simulation, and 4) assessment of climate resilience and co-benefits and trade-offs.

There are six categories of LMT within the scope of LANDMARC, which are agricultural & agroforestry land use, peatland and forestry, soil carbon storage, bioenergy with carbon capture and storage (BECCS), biogenic waste and management, and other ecosystems. The Indonesia case study under LANDMARC falls into two categories (agriculture & agroforestry, and biogenic waste management) focusing on biogas and compost. Hence, three case studies of the research include small scale biogas and compost in Bali and Bajawa, medium-scale compost and large-scale compost in Bali.

Figure 4 on The explanation about Indonesia case studies in LANDMARC

The LANDMARC project has several activities for this study: 1) Formulate national and regional negative emission solution (NES) scaling scenarios, 2) Assess the effectiveness of land-based mitigation at the case study level, 3) Land-based NES simulation and modelling, 4) assess the impact of NES and 5) contribute to dissemination and publication from this project.

To define the NES scope for Indonesia, some Indonesian stakeholders have been contacted to introduce the project, seek collaboration, and collect the LMT narratives. There are some national and local stakeholders, such as the Indonesia Meteorology Office (BMKG), Indonesia Geospatial (BIG) and Institute of Aeronautics and Space (LAPAN), for climate, meteorological & remote sensing, and Ministry of Energy & Mineral Resources (MEMR/ESDM) for energy and policy. Other stakeholders are the Ministry of National Development Planning (BAPPENAS) for policy insights, Ministry of Environment and Forestry (KLHK) for biodiversity and land use, Agriculture and Food Security Services (Distanpangan) for agriculture and ecosystem, Statistics Indonesia (BPS) for demography and socio-economic, Soil Research Centre (Balittanah), Research Centre and University Lab for in-situ measurement. Finally, this event would be essential for both

validation of the narrative and the co-design of LMTs that will be executed as the next research step.

1.4. Introduction to IKI Small Grants in Indonesia

By: Fabian Wiropranoto (su-re.co)

Su-re.co has been working with the biogas development since 2016, continuing two European projects (i.e., TRANSrisk and GREENWIN) to provide user-friendly biogas units. Under IKI Grants, this initiative intends to support farmers in getting affordable clean energy for cooking and organic fertilizer for climate-smart agriculture practice by providing user-friendly and small-scale biogas digesters. Currently, su-re.co has installed 25 digesters throughout 2020 in Flores and Bali island. Moreover, su-re.co wants to ensure that farmers keep using the provided biodigesters.

On top of user benefits, carbon offset and waste management are environmental benefits that can be utilized to also improve the farmers' life. With this, su-re.co aims to create a carbon offset platform with the biodigester to connect farmers with the carbon market. Under IKI small Grants, the project aims to tackle social, economic, and environmental sustainability by introducing blockchain technology. By 2022, the initiative plans to install 40 biogas digesters, create a carbon offset purchasing platform, and have 40 farmers participate in the Climate Fields School with BMKG as a capacity-building measure. The blockchain technology provides a cheaper carbon trade scheme straight to the users and beneficiaries, thus reducing the costly certification fee, adding biogas' value. Eventually, utilisation of technology incentivises the farmers, increasing their livelihood (socio-economic impacts). In this workshop, the involved stakeholders should address how each actor can collaborate between sectors and further synergise to help the smallholder farmers.

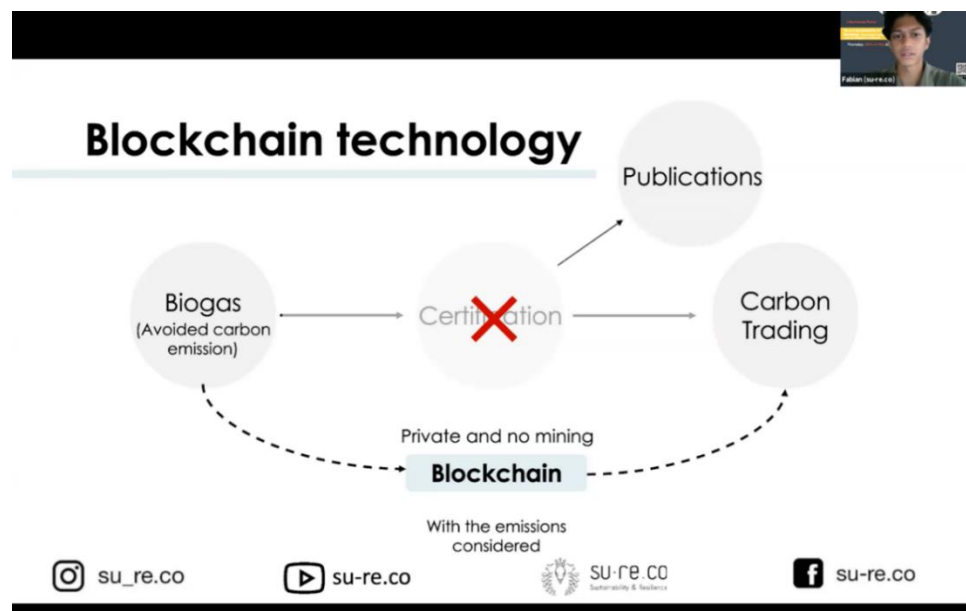


Figure 5. The role of blockchain technology under IKI's Biogas Initiative

2. The Importance of Adaptation Efforts to Complement Mitigation Actions

2.1 The Role of NGO in Climate Change Adaptation Efforts

By: Arif Wibowo (Directorate for Climate Change Adaptation, Ministry of Environment and Forestry)

There are two groups of stakeholders: party stakeholders and non-party stakeholders, according to the Paris Agreement (paragraph 133). The central governments and regional governments are classified as the party stakeholders' side, while the non-party stakeholders include the civil society, private sector, research institutions, financial institutions, and NGOs. Each stakeholder is expected to synergise in adapting to climate change impacts. Nowadays, the government lists contact persons of the relevant stakeholders and how they could participate in the joint activities. In responding to climate change impacts, KLHK has intensive coordination with BNPB (Indonesian National Board for Disaster Management) and BMKG. However, such collaboration still requires improvement, including methods for the impact assessment. Additionally, climate information and data are provided by BMKG (Meteorological, Climatological, and Geophysical Agency). The synergistic of methodology is open for collaboration, such as exploring the implication of rising temperature in agroforestry.

Furthermore, the role of NGOs to support climate change adaptation is also essential in addition to mitigation actions. The climate change adaptation in Indonesia focuses on several issues aiming to increase capacity, strengthen resilience, and reduce the climate change risk by 2030. Some efforts to address the aforementioned issues include increasing climate literacy, enhancing the local capacity and policies, risk management, and application of adaptive technology. NGOs are essential in providing assistance in knowledge management and bridging the gap between the policymakers in society. NGOs can participate in adaptation actions by organising relevant activities to expand knowledge management and strengthen the local capacity, as an example. Additionally, other pertinent stakeholders can participate simultaneously in this process.

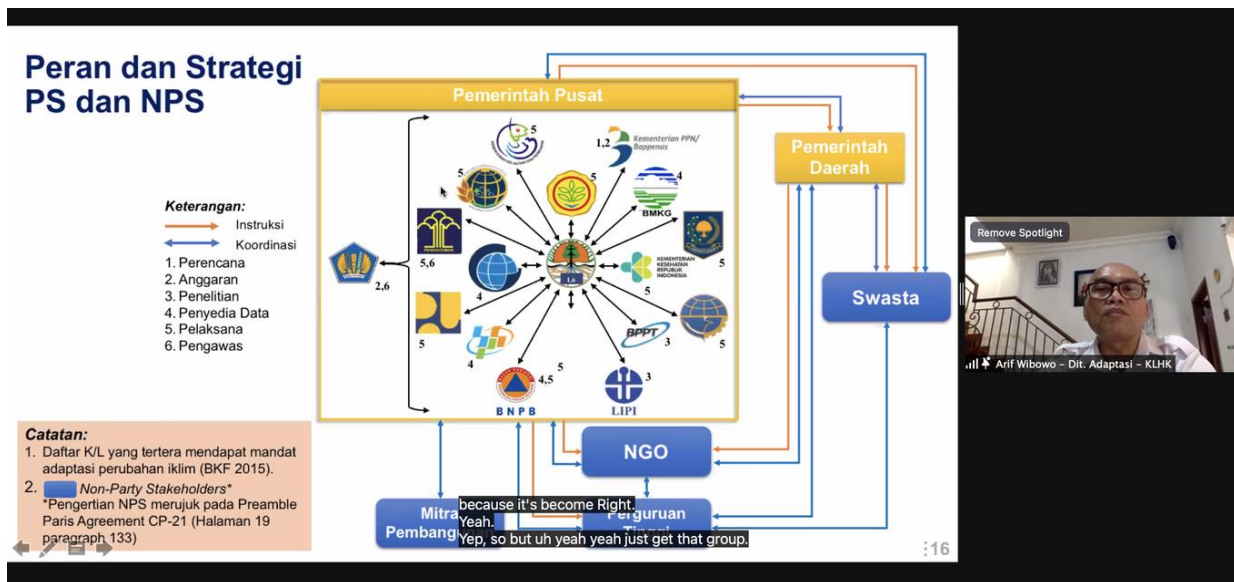


Figure 6. Overview of the stakeholders' roles in adaptation strategies

3. Narratives for clean energy transition and land-use mitigation technologies in Indonesia

3.1. TIPPING+ Discussion on Clean energy transition in Indonesia

This discussion aims to identify the key actors that will lead and navigate the energy system in Indonesia. The participants used the survey to define the types of renewable energy that potentially transform the current system, looking at the organisation's capacity (i.e., power, technology, data information, and funding).

Most of the participants chose solar energy and biomass for the types of renewable energy that will transform the current carbon-intensive electricity systems. PT. PLN (state-owned electricity company), Ministry of Energy and Mineral Resources, Ministry of Finance, local authorities, and BAPPENAS were appointed as the key actors from governmental agencies to enable the clean energy transition. In addition, the Ministry of Cooperatives can be another key government actor in promoting clean energy transition by supporting SMEs (Small Medium Enterprises) in producing local materials or equipment for renewable technology. Establishing enabling regulations and funding will initiate the energy transition and collect the resources and the equipment. Moreover, mass media and civil society are expected to take their roles, for instance amplifying public discourse on clean energy use and adopting the technology, respectively.

Table 1 List of participants of the TIPPING+ FGD session

No	Name	Affiliation
1	Cynthia	su-re.co
2	Sarah Wibisono	su-re.co
3	Praptono Adhi	Ministry of Energy and Mineral Resources [MEMR]
4	Hasmina Tari	Universitas Haluleo
5	Anna Reani	PT. Indonesia Power [IP]
6	Ichi	Open Government Indonesia
7	Wahyu Widodo	Groningen University
8	Rinna Santi	Ministry of Energy and Mineral Resources [MEMR]
9	Noviyanti	Ministry of Environment and Forestry [MOEF]
10	Rizqi Prasetyo	Institute for Essential Service Reform [IESR]
11	Defrita Fitri	Sebelas Maret University
12	Novem Brianto	PT. Krakatau Daya Listrik
13	Afina Winarsari	Universitas Padjajaran (UNPAD)
14	Jamhari	PT. Garam (Persero)

3.2. LANDMARC Discussion on Land-use Mitigation Technologies and Practices

This session aims to exchange knowledge between stakeholders, adhere to key challenges and potential planning, and collaborate in the research projects, particularly in the data collection in the modelling and narratives of LMTs from Indonesian stakeholders. The discussion proceeded with responding to two questions to indicate the main narrative in land-based mitigation and identify implemented modelling system and scenario in Indonesian land-use mitigation.

In most cases, Indonesia favors forestry and peatland as land-use-based carbon capture storage, but su-re.co representatives pointed out that agroforestry could function as an alternative. Tropical agroforestry can also function as an alternative for climate change mitigation and adaptation. It could help reduce the deforestation problem by being the middle ground for forest activity and allowing income for society. As a bridge between forestry and agriculture, agroforestry can contribute to environmental services. Not only providing nutrient balance, but the land-use could be multifunctional by supporting plan productivity and environmental services. On the other hand, the applicability of Bioenergy with Carbon Capture Storage (BECCS) is difficult to implement in Indonesia because of the absence of policy support on this type of LMT. Additionally, indigenous knowledge could be relevant to the land-use based mitigation context.

The method for land-based mitigation in Indonesia uses the local data for a higher scale estimation, i.e., GIS (Geographic Information System) estimating the impact of each land use. In LANDMARC, some modellings (climate, land use, and economic) and climate scenario will be used to assess the land-based mitigations and climate risk sensitivities. One example in the

agroforestry case mentioned by Universitas Brawijaya representatives is cacao land-based mitigation; as in Indonesia, cacao is a big commodity. Cacao agroforestry usually uses a particular model, called WANULCAS, to see the environmental impact of a cacao plantation. Another model used is the GENRIVER model that assesses river water-related land use. Representatives from CARI! pointed out that the bearing capacity of the hazard content that comes from natural hazard and natural technology should be considered.

Table 2 List of participants of the LANDMARC FGD session

No	Name	Affiliation
1	Siti Indriani	su-re.co (host)
2	Clarissa Rahmanita	su-re.co (note taker)
3	Arif Wibowo	Ministry of Environment and Forestry (MOEF)
4	Arif R. Darana	[CARI!]
5	Cynthia W	Xi'an Jiaotong-Liverpool University
6	Dandi Arianto Pelly	Hasanah Surveyor Raya
7	Danny D Saputra	Brawijaya University (UB)
8	Diah Winarni	RSUPN (National Development Hospital) Dr. Cipto Mangunkusumo
9	Julya Angelita	SMKN (Public Vocational Secondary Schools) 3 Balikpapan
10	M. Irvan	DLH (Environmental Agency) of Sanggau Regency
11	Rakhmat Prasetya	BMKG (Meteorological, Climatological, and Geophysics Agency) of Maros Regency

3.3. IKI Biogas Initiative Discussion on Blockchain for Biogas Development

During this discussion, participants identified current challenges and opportunities in scaling up biogas deployment. First is the lack of capacity building and technical assistance to maintain long-term use of the technology. Together with BPTP (Agricultural Technology Research Center), there have been discussions in biogas installation in Bali. Other encountered challenges include insufficient livestock, the distance between the facility and the users for existing biogas units.

Second, fund and incentive deficiency is also challenge. Biogas installation can be quite costly to some consumers. While donor-based installation can be an alternative, this approach may not be suitable for large-scale implementation. Third, as explained by RDI (Resilience Development Initiatives), the current challenges in scaling up biogas installation are government support and policy. Policy support prioritisation from the government will be beneficial to maximise the utilisation of biogas. In addition, the issue about ER (Equivalence Ratio) fluctuations of biogas generation across project locations should also be considered. Ultimately, these challenges will demotivate the users, particularly the farmers in using biogas.

The rest of the discussion revolved around clarifying blockchain usage. For instance, how would the validation and verification process be if blockchain replaces certifications. Su-re.co responded by elaborating how publications and activities from su-re.co would be crucial for blockchain carbon offset's validation and verification. It is presumed that biogas output data can be validated by blockchain even though the carbon emission reduction is still heavily relied on input. (i.e., emission varies between foodwaste and manure input). Thus, the farmer activities are considered social data to validate the carbon offset in the current project. The scientific publication would also include the profile of farmers, livestock, and other activities for selling carbon offset alongside the aforementioned social co-benefits.

In terms of synergized efforts, the involved stakeholders like GIZ, RDI, Indonesian Biogas Association, and SouthPole are open to collaboration in promoting small and medium-scale biogas development. The Indonesian Government, GIZ – Explore, and the Indonesian Biogas Association, currently have workshop series on capacity building and business design and project financing to address the lack of technical assistance. The South Pole's representative added that capacity building is attractive as a co-benefit. It will increase the scalability if they correspond with education and women involvement, for example.

Table 3 List of participants of the biogas FGD session

No	Name	Affiliation
1	Fabian	su-re.co
2	Amanda	su-re.co
3	Hadis	BPTP (Agricultural Technology Research Center) of Bali Province
4	Tyas	GIZ
5	M. Rizki Maulana	GIZ
6	Grizelda	South Pole
7	Zahra Amani	IPB (Bogor Institute of Technology) – Applied Petrology
8	Nadya	Resilience Development Initiative (RDI)
9	Amelia Christina	Resilience Development Initiative (RDI)
10	Rinna Santi	Ministry of Energy and Mineral Resources (MEMR)- Oil and Gas Directorate
11	Shabrina Nadhila	South Pole
12	Sofi Hanifah	ITB (Institute of Technology Bandung)
13	Hasmina Tari Mokui	Haluleo University
14	Nadya Rosyalina Putri	University of Lampung
15	Anggraeni Hadi Pratiwi	Raden Rahmat Malang Islamic University

Concluding Remarks

The Open Government (OG) Week was successfully held to increase the synergy with the pertinent stakeholders with the support from the Indonesian Government and European Commission partners. This workshop enabled su-re.co to gather new insightful narratives for the project development (i.e., TIPPING+, LANDMARC, and IKI Small Grants program). Most participants agreed that solar energy and biomass potentially challenge the current mainstream system for Indonesia's energy transition. Initiation on policies and funding that focuses on applying alternative energy is crucial to shift from the current coal-based energy source. Further, the energy transition requires active participation from different actors at the national and local levels. Additional key actors were mentioned during the discussion, such as mass media to amplify public discourse on energy transition and governmental agencies.

For land-use mitigation, the importance of how land-use can be beneficial socially and environmentally was discussed. The discussion also concluded that research on a bigger scale with the help of a model would enable assessing land-use parameters. However, this would require new knowledge such as what model to use and what data would be relevant to apply in the approach (i.e., Global Imaging System, GENRIVER, and WANULCAS model). Lastly, the biogas project focuses on creating more impact through the application of blockchain. It highlighted the need for capacity building and funding to scale out the initiative faster. Tools such as policy and expansion in social impact would also foster the biogas scale-up through more stakeholders' involvement. Another critical point is the collaboration between stakeholders in addressing the adaptation and mitigation to climate change. Both governmental agents, such as the ministries and non-governmental agents (i.e., educational institutions, research institutes, NGOs, and private companies), have significant roles to contribute to the primary narratives in clean energy transition and land-use mitigation in Indonesia.

On top of that, biogas as a clean energy source also has potential for land-use mitigation yet having several challenges to be addressed. To enhance the value of biogas, blockchain is potential for replacing costly the validation and verification process in the certification of carbon trade for improving biogas value. The scientific publication is fundamental to ensure the credibility of validation and verification of GHG measurement from biogas. More importantly, all participants, which are mostly the pertinent stakeholders, are open to collaboration in enforcing climate mitigation and adaptation strategies through energy transition towards clean energy, promoting land-use-based mitigation, including biogas development.

Appendix

Appendix 1 Event Agenda

Time (Bali Time)	Activity	Speaker		
15.00 – 15.05	Opening and registration	MC (su-re.co)		
Introduction Session				
15.05 – 15.10	Welcoming	MC		
15.10 – 15.25	Introduction of su-re.co	Dr. Takeshi Takama, CEO of su-re.co		
15.25 – 15.40	Project Introduction: TIPPING+, LANDMARC, IKI: Biogas Initiative	Cynthia Ismail, Researcher at su-re.co Siti Indriani, Fabian Wiropranoto		
Focus Group Discussion				
15.40 – 15.45	FGD introduction	MC		
15.45 – 16.10	Breakout room discussion Seeking collaboration opportunities for the respective project	Room 1: TIPPING+	Room 2: LANDMARC	Room 3 : IKI Biogas Initiative
		"What are transformative narratives in Clean Energy Transition."	"What is the narrative, modelling system and climate scenario is currently implemented in land-based mitigation."	Who are interested in being biogas implementation partners and blockchain development partners?
16.10 – 16.30	General Room: FGD Report and QnA	Moderator: Cynthia, Indri, Fabian		
16.30 – 16.45	Role of non-government sector in climate change adaptation efforts	Directorate of Climate Change Adaptation, Ministry of Environment and Forestry		

16.45 – 17.00	QnA discussion and Closing	MC

Appendix 2 List of Participants during the event

No	Name	Affiliation
1	Amanda Ramadhani	su-re.co
2	Clarissa Idat	su-re.co
3	Cynthia Ismail	su-re.co
4	Fabian	su-re.co
5	Mana	su-re.co
6	Oktavianna Winda	su-re.co
7	Sarah Wibisono	su-re.co
8	Siti Indriani	su-re.co
9	Takeshi Takama	su-re.co
10	Arif R. Darana	[CARI!]
11	Patrícia Lourenço	AgroInsider
12	Eka Panca Bukhori	BEM
13	Hadis	BPTP Bali
14	M Irvan	DLH Kab. Sanggau
15	Ervinda Yuliatin	ELC
16	Iqlima	GIZ
17	Tyas	GIZ
18	M Rizki Maulana	GIZ ExploRE
19	Dandi Arianto Pelly	Hasanah Surveyor Raya

20	Wisnu Wicaksono	IMechE
21	Resmita	Indocement
22	Zahra Amani	Institut Pertanian Bogor
23	Basuki	Institut Teknologi Bandung
24	Sofi Hanifah H	Institut Teknologi Bandung
25	Salsabilla Syifa Oksanda	Institut Teknologi Sumatera
26	Rizqi Prasetyo	Institute for Essential Service Reform [IESR]
27	sheila carina	Microsave Consulting
28	Rinna Santi Sijabat	Ministry of Energy and Mineral Resources - (MIGAS)
29	Praptono Adhi	Ministry of Energy and Mineral Resources (MEMR)
30	Arif Wibowo	Ministry of Environment and Forestry (KLHK)
31	Noviyanti	Ministry of Environment and Forestry (KLHK)
32	Dewi Resminingayu	Open Government Indonesia
33	Ernitia	Omdena
34	Ichi	Open Government Indonesia
35	Anna Reani	PT. Indonesia Power [IP]
36	Anisa Kusumaningrum	PTI
37	Amelia Christina	Resilience Development Initiative
38	Nadiya Pranindita	Resilience Development Initiative
39	Yan Lynn	Singapore Management University
40	Julya Angelita	SMKN 3 Balikpapan
41	Griselda N	South Pole
42	Shabrina Nadhila	South Pole
43	Larsen Alessandro	UCSI University
44	Felicia Gunawan	UIS

45	Wahyu Widodo	Univ. Groningen
46	Danny D Saputra	Universitas Brawijaya
47	Hasmina Tari Mokui	Universitas Halu Oleo
48	Nadya Rosyalina	Universitas Lampung
49	Afina Winarsari	Universitas Padjajaran (UNPAD)
50	Fadli	Wanua Panrita
51	Cynthia	XJTLU
52	Anggara	Yayasan Bumi Sasmaya
53	Yoshida Aozora	Kayashima class
54	Aicha Grade Rebecca	Public
55	Akhmad Musyafak	Public
56	Al Rafi Rizqullah	Public
57	azis kurniawan	Public
58	Cynthia Wardhana	Public
59	Defrita Fitri Ramadhani	Public
60	Diah Winarni	Public
61	Dita	Public
62	Dwiana Cahyani	Public
63	Ernitia Paramasari	Public
64	Erqin Pramono	Public
65	Fenita	Public
66	Fujino	Public
67	Geminingsih Nastiti	Public
68	Helmi Abidin	Public
69	I Nengah Mardika	Public

70	Inna Junaenah	Public
71	Jamhari A	Public
72	Jesse Driver	Public
73	Kento Onaka	Public
74	Lina Kristanelina	Public
75	Mariana Silaen	Public
76	Muhammad Akbar Annahl	Public
77	Mukhamad Arifin	Public
78	Mutiara	Public
79	Novelita W. Mondamina	Public
80	Novem Brianto	Public
81	Putri M	Public
82	Putu Anggara	Public
83	Rakhmat Prasetya	Public
84	Rendy Primrizqi	Public
85	Retno Angraeni	Public
86	Septiana Ulandari	Public
87	Soni Aditia Abdullah	Public
88	Sumarni Arni	Public
89	Sumba Basuki Tri Laksono	Public
90	Susi Setiaramdani	Public
91	Suya Patni	Public
92	Taki Kitada	Public
93	Theo	Public
94	Yan Lynn Frank	Public

95	Yasser Wahyuddin	Public
96	Yudiandra	Public
97	Yusuf suryanto	Public
98	Zisti Shinta	Public
99	信人 秋間	Public

Appendix 3 Event Link

1. Zoom Link

<https://us02web.zoom.us/j/81596754361?pwd=ZmkzR3VQcnUySDVqRitna01DRVlqdz09>

2. Notes during Tipping + Breakout room

ROOM 1 - TIPPING+

Q2. Who are the key actors in implementing the clean energy transition

Example:
WHO-BAPPENAS,
PLN, University

Hasmina - I think
not only PLN and
vendor itself, but
also its people
responsibility,
University student,
researcher

Praptono Adhi
(MEMR) - 3 side
government,
multi-sectional
agency, and
legislation. That's
implemented
decentralized to
local government.

Hasmina Tari -
Academia,
Regulator,
Politician

IP - each household in
Indonesia should be
able to implement
green energy (such as
rooftop solar, etc) but
the government (such
as kemenkop) should
be able to give funds
to support them with
the incentive for
green energy instead
of the existing

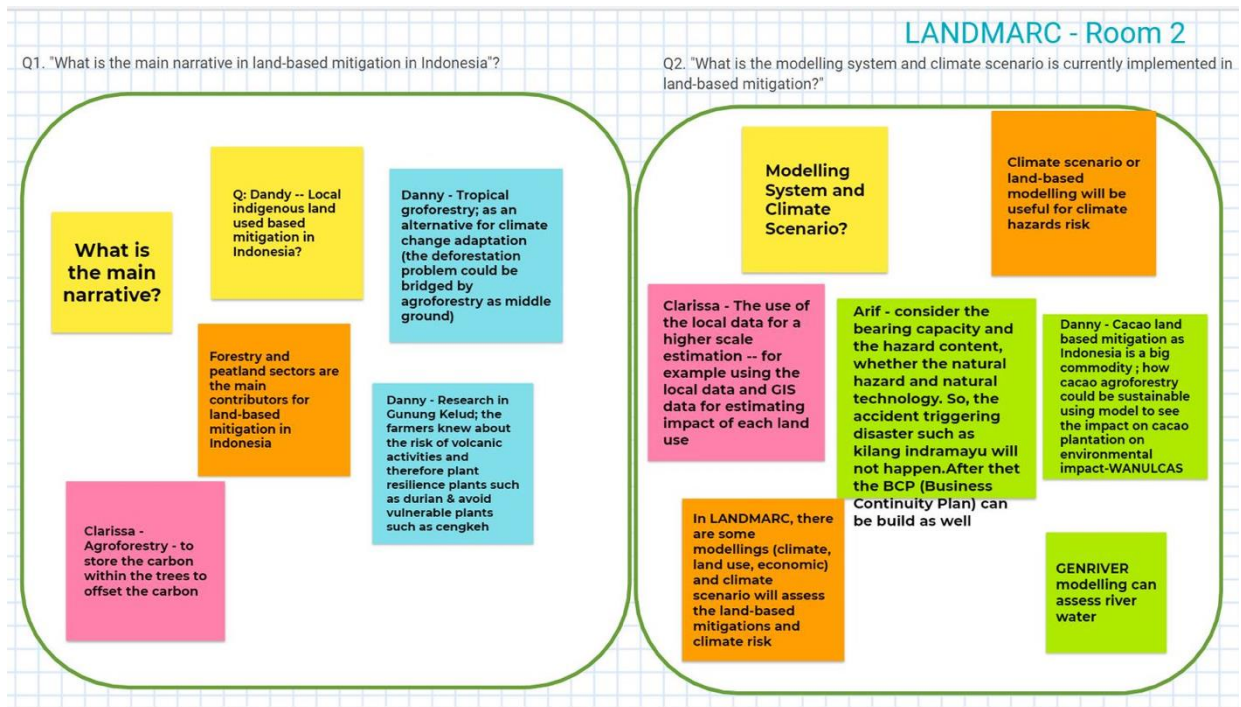
Q3. What resources/activities they have to transform current energy system?

Power (Policy,
regulation,
orders)

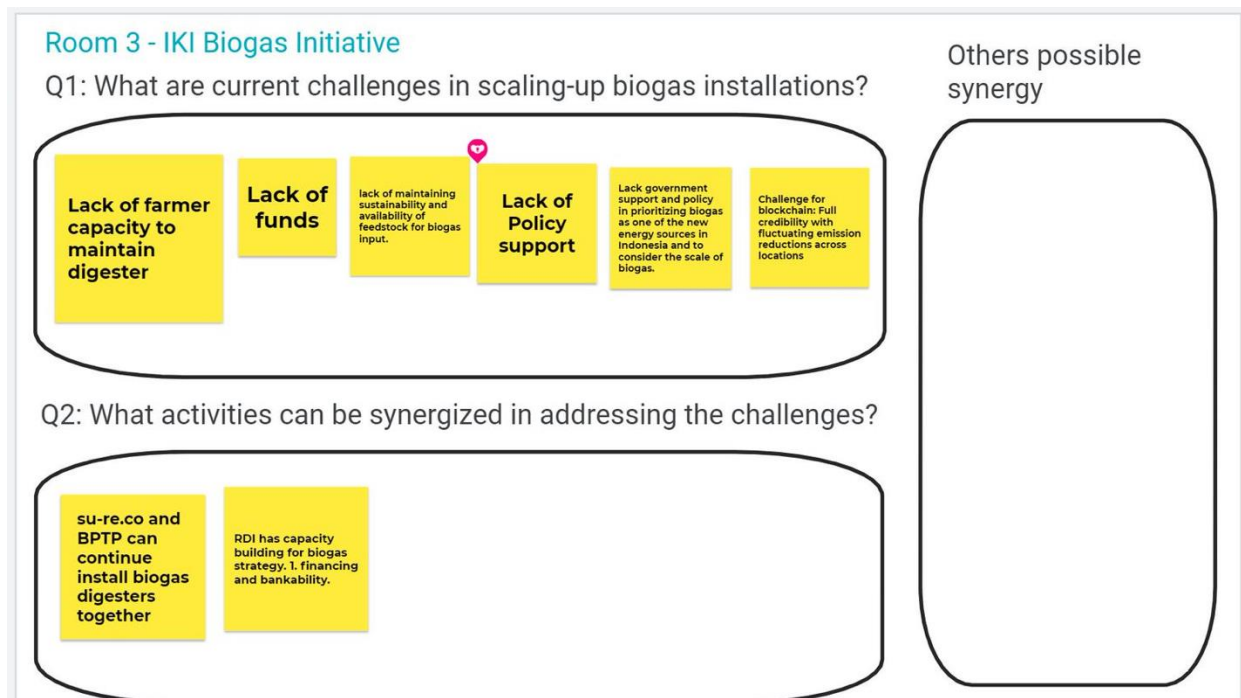
Praptono Adhi
MEMR - Enabling
regulation, fund,
agency, the
incentive for
transformation.

Hasmina Tari -
Put regulation
and connect
into enabler

3. Notes during LANDMARC Breakout room



4. Notes during IKI Biogas Initiative Breakout rooms



Appendix 4 Question and Answer Session

1. Introductory Session

Q1:

Does su-re.co open for collaboration with local NGO/social enterprise in Indonesia? If so, how do we proceed?

Response from Takeshi

Up to what collaboration you meant; in the biogas, any collaboration is open. For the research, we would assess the proposal. Please do reach out through contacts on our website.

Q2:

Does su-re.co open collaboration with academia too?

Response from Takeshi

Same with previous. (Up to what collaboration you meant; in the biogas, any collaboration is open. For the research, we would assess the proposal. Please do reach out through contacts on our website.)

Q3:

Can you explain more about BECCS? And why it is not possible in Indonesia?

Response from Indri

BECCS – bioenergy carbon capture storage; We had a meeting with LCDI (Low Carbon Development Indonesia) and the Ministry of Energy and Mineral Resources of the Republic of Indonesia. It is not that it is not possible, but it is currently would be hard to implement since we do not have the technology. In the Netherland, they have the carbon capture tank and further put that to the soil. PERTAMINA plans to have the technology of carbon capture tank, so you might want to check. However, currently, the ministries are limited to plan and not implementing.

Q4:

How would a blockchain system replace the verification/validation process in certification?

Response from Fabian

What we are selling is not just the offset. We are aiming to collect the data from the flow emitter and include it in the blockchain

Q5:

Annual emission reductions can fluctuate depending on various on-site factors — how does the blockchain account for these variables?

Response from Fabian

It varies from farmers to farmers; each farm with a different system would also have differences in the amount of carbon offset between management practices and farms.

Q6:

How much net kg of GHG is avoided from biogas utilisation? As we know, biogas is also methane, and methane burning is also emitting CO₂.

Response from Fabian

It varies between farms and what they fed the biogas digesters with.

Q7:

How to implement the carbon offset calculation in such a diverse system in the field with various influents and quantities? Thank you!

Response from Fabian

Answered along with the previous question (It varies from farmers to farmers; each farm with a different system would also have differences in the amount of carbon offset between management practices and farms)

Q8:

Regarding blockchain trading, how could the carbon offset be traded through blockchain? Furthermore, how could it be implemented for small-scale users?

Response from Fabian

This can be done through the “token” system. However, this is not our current goal. Instead, the coins are hopefully can be traded in the future. Our main goal, for now, is to create the link between farmers to the carbon offset market. Then, in the long run, we could talk about the marketable of the carbon offset.

Q9:

What are the selection criteria of the farmer to get the small biogas scale?

Response from Fabian

It has to have something that could feed the biogas.

Q10:

How would a blockchain system replace the verification/validation process in certification?

Response from Fabian

Same with previous (This can be done through the “token” system. However, this is not our current goal. Instead, the coins are hopefully can be traded in the future. Our main goal, for now, is to create the link

between farmers to the carbon offset market. Then, in the long run, we could talk about the marketable of the carbon offset.)

2. Plenary session

Q1:

How is the NDC synergised with other Ministries planning documents, such as RUEN etc.? each Ministry often has different plans/targets

Response from Pak Arif

In setting targets, it is based on determining what sectors should be intervened together with other ministries. For example, the water resource for hydro power in which can also be utilised to improve land use. The relationship is with the use of water and food security requires cross collaboration with other ministries like Ministry of Agriculture and Ministry of Public Work. First, we set priorities. Once the priorities are set, other sectors could provide substantial interaction. The relationship within the ministries is important to pursue the same goal, such as water, food security and sustainability. We also need cross-sectoral interaction to run the program. For example, now we are talking about rice, but we talk further in the future because there are many commodities other than rice. So, we have to analyse how other commodities also affect the sustainability aspect.

Q2:

How is the collaboration with BNPB? What is the strategy?

Response from Pak Arief

Internationally we have two commitments. We have much interaction with BNPB. Much homework, the problem of our impact assessment methodology needs support regarding strengthening many issues

Q3:

Currently, I work on how agroforestry can help the cocoa farmer to adapt to climate change. I am interested to know more about the climate projection that you have presented today. How can I assess that climate projection data? Thank you

Response from Pak Arief

Climate projection is analysed through a variety of resources. For ocean already available. We use BMKG data, and we are currently preparing to publish it online, but the roadmap document is final and accessible (NDC documents). We are open to synergies and methodology especially. For example, Malang agroforestry is difficult because there is a drop in productivity due to increased temperature.

3. Tipping + Breakout room

Q1. What are the types of renewable energy to transform current electricity systems?

Participants are given time to do the polling. The polling result is 78% choosing Solar (i.e., rooftop, power plant) and 22% for Biomass, collected from 9 participants. Most participants suggested being able to choose more than one type of renewable energy.

Q2. Who are the key actors in implementing the clean energy transition?

Response from Hasmina - Universitas Haluleo: In Indonesia, the main actors are PT. PLN and the government. Not to forget other parties, but it is important to get Indonesian citizens to realize the importance of implementing clean energy. Also, the research team for the university or academia can support publishing what and how to do about implementing clean energy and adapting to our household environment.

Response from Pradipto Adi – Ministry of Energy and Mineral Resources (MEMR): It is a multi-dimensional context. We can divide key actors in implementing the clean energy transition into three sides; the government, multi-sectional agency (Ministry of Energy, Ministry of Finance, and people's Representative Council) also from PLN (National Electricity Company) itself as the actor, local government and the people as the market in residential areas and industries. So, it is a bit complex, but we can differentiate among the three sides. Each side has its key roles, and we still designing the road map of the clean energy transition.

Response from Anna - PT Indonesia Power (IP): Not only MEMR (Ministry of Energy and Mineral Resources) or BAPPENAS (Ministry of Development and Planning) but also the Ministry of Cooperatives need to be in charged to support the implementation of the clean energy transition. However, for this moment, Mr Teten Mastugi (Ministry of Cooperatives) provides Local Organization (Coop) for certain activities except for electricity.

Response from Rizqi Prasetyo - Institute for Essential Service Reform (IESR): Mass media, as they took part in publicly or targeted sharing information (bottom-up and top-down), amplifying public discourse, and also public interest advocacy.

Q3. What resources/activities they have to transform the current energy system?

Response from Hasmina - Universitas Haluleo: I read one of the articles that Indonesia has not had some resources yet regarding interconnection to renewable energy with the existing grid. We need to add coats and regulations regarding that and connect with the grid to renewable resources, like solar, wind-power, to avoid failure in the system.

Response from Pradipto Adi - Ministry of Energy and Mineral Resources (MEMR): This is about enabling regulations and funding for citizens to transform the current energy system. If the regulations already exist, but there is no funding, the resources between enabling regulations and funding will be nothing. So, the funding as an incentive for citizens can transform the current energy system into a clean energy transition in the future.

Response from Anna - PT Indonesia Power (IP): Give more funding and engage the project of the clean energy transition to Indonesia citizens. For example, the Ministry of Cooperatives might support people

in Indonesia by providing fund and initiating the UMKM (Micro, Small and Medium Enterprises) program to get and buy equipment for green electricity.

Q4: Cynthia (su-re.co)

How the coordination and communication at the local level, and how the Ministry can coordinate until the implementation?

Response from Pradipto Adhi

The energy plan will be on top-down coordination from the central government into the local government. So, the coordination will be from top to bottom.

Q5 and remarks: Hasmina

I am not sure whether Indonesia can already interconnect between the existing grid into renewable resources as far as I know. I read yesterday one of the articles that Indonesia has not had some resources yet regarding interconnection to renewable energy with the existing grid. Compare to Australia, the US, and other countries in Europe. They already had that kind of coats. So, I am not quite sure about Indonesia. Probably anyone from PLN or the Ministry of Energy can give some insights? Because I think, if we want to transform green energy into the existing power system, we need to have those kinds of coats related to the intermittency of the renewable energy itself. We need to add coats and regulations regarding that and connect with the grid to renewable resources, like solar, wind-power, to avoid failure in the system. So, we need more collaboration between academia and the utilities, which is PLN, a generation company like Indonesia Power. We also need some source support from the regulator and government, people in legislation, and DPR.

Response from Anna:

Responding to Hasmina's question

I think people in Indonesia need to start to have green energy. Suppose each individual in Indonesia can sell green electricity like solar rooftop, biogas, etc. If they do not have enough money to get and buy the equipment to support green electricity, we can initiate with UMKM program from the Ministry of Cooperatives. This program might support progressive renewable energy for electricity.

4. Landmarc Breakout room

Q1: What is the main narrative in land-based mitigation in Indonesia

Response from Clarissa Rahmanita – su-re.co: In the major cases, we talk about peatland in land used based carbon capture storage. However, there are several land uses in Indonesia that could be used in land-use based mitigation. One of the examples is agroforestry to aim to store the carbon within the trees. This could help to offset the carbon. Does anyone else have anything to add?

Response Danny D. Saputra – UB: Agroforestry happen to be my main research focus, mainly tropical forestry. Tropical agroforestry can also function as an alternative for climate change adaptation. In addition, it could help reduce the deforestation problem by being the middle ground for forest activity and allowing income for society.

Response from Dandi Arianto – Hasanah Surveyor Raya: I have a question for anyone: Is there any known local or indigenous land use-based mitigation that has the potential?

Response from Danny D. Saputra – UB: Agroforestry happen to be my main research focus, mainly tropical forestry. Tropical agroforestry can also function as an alternative for climate change adaptation. In addition, it could help reduce the deforestation problem by being the middle ground for forest activity and allowing income for society. Other than that, agroforestry requires a suitable design. Indigenous knowledge could help the design, in which the local people have the knowledge of what trees suits best to the area. For example, the locals would choose durian over clove in the Merapi regions because they are more resistant to fire and mount eruption. In contrast, clove would easily die after the eruption.

Q2. What are the modelling system and climate scenario currently implemented in land-based mitigation in Indonesia?

Response from Clarissa Rahmanita (su-re.co): If this might take a while, I could give an example. One of the currently used methods is the use of the local data for a higher scale estimation, for example, using the local data and GIS data to estimate the impact of each land use. Anyone else has any other idea? In LANDMARC, there are some modellings (climate, land use, economic), and the climate scenario will assess the land-based mitigations and climate risk

Response from Danny Saputra – UB: Cacao land-based mitigation as Indonesia is potential as it is a big commodity; how cacao agroforestry could be sustainable using model to see the impact on cacao plantation on environmental impact WANULCAS. There is also the GENRIVER model that assesses river water-related land use.

Response from Arif R. Darana – [CARI! : We should consider the bearing capacity and the hazard content, whether the natural hazard and natural technology. So, the accident triggering disaster such as Indramayu Refinery does not happen and afterwards, the BCP can be built as well.

5. IKI Biogas Initiative Breakout room

Q1: What are the current challenges in scaling up biogas installations?

Response from Zahra Amani: expensive cost of biogas installation can be quite a challenge for users.

Response from Fabian: Fund is one of the barriers to scaling up. All of the Biogas programs fall into two things: 1. Lack of Capacity Building from the users to continue. This connects to a lack of technical assistance and incentives, which demotivate farmers or biogas users to continues 2. Lack of funds to continue to install. Currently in su-re.co, our biogas installation is donor based. However, this approach may not be sustainable to do a large-scale implementation.

Response from Hadis Jayanti (BPTP Bali): BPTP has discussed with su-re.co on biogas installation in Bali Province. There are some challenges during installation, for instance: Farmer not implementing biogas installation sustainably. Although under the SIMANTRI (Integrated Farming System) program, BPTP has installed more than 700 biogas digesters for farmers with various commodities, most of them not sustainable anymore because 1. Capacity 2. Source (livestock not enough) 3. Installation cannot reach the farmer's household.

Thus, there is an opportunity for su-re.co and BPTP to start over the biogas installation to evaluate the problem and solve it with a better approach, especially biogas installation for coffee and cacao farmers.

Nadya (RDI): the current challenges in scaling up biogas installation are the lack of government and policy support policy. There also different challenges based on the scale of the biogas – small, medium and industrial.

Policy support relates to maximum utilization of biogas. For instance, if we sell biogas for electricity, cooking, then we need to support the government for testing, policy, infrastructure to support biogas installation. To scale up, the government also need to prioritize biogas as one of the new energy sources in Indonesia.

Tyas (GIZ): Agree with Nadya from RDI. Different scale of biogas faces different challenges. In industrial-scale biogas, biogas plant face financing, technological options and incentives challenges. At the moment, the most important challenge is the market condition because we need to know the off-taker and who will maintain and utilized (i.e., who will buy the electricity generated from biogas). Secondly, the sustainability and availability of feedstock for biogas are also crucial challenges for all biogas scale. Sometimes the feedstock is seasonal. Thus, we have ensured that it would be available all year. Thirdly, the availability of the land, especially for industrial-scale biogas, needs to be addressed. Lastly, policy and legislation support are needed.

Grizelda (South Pole): "the South Pole is one of the biggest carbons develop and trade carbon credits. I have several questions:

1. How blockchain would replace the validation and verification process in certification? Because certification would guarantee the project's credibility, and people would be willing to buy carbon generated.

2. if it is credible, how credible would the blockchain be? So that people can invest in this project for to scales? "

Q2: What activities can be synergized in addressing the challenges?

Response from Nadya (RDI): lack of technical assistance may be addressed with the current RDI program. RDI with European Partner, Indonesian Government, GIZ – Explore, Indonesian Biogas Association currently has biogas stakeholder workshop series on capacity building and business design. The next capacity building workshop in July will be about Biogas project financing and bankability. RDI is still

focused on industrial-scale biogas, but we are open to exploring small and medium scale biogas. If anyone interested, please contact her.

Response from Grizelda (South Pole): Capacity building is interesting as a co-benefit. In the carbon market, people willing to pay more knowing that they touch several SDGs at one carbon purchase (i.e., education, capacity building and women involvement). How would you count fluctuating ER across project locations?

Response from Fabian: Publication and su-re.co activities will be a crucial factor on top of blockchain to verify and validate carbon offset. Blockchain will validate biogas' output data, which is still arguable. However, it is not exactly about carbon emission reduction because biogas is still heavily reliant on input (i.e., the difference of carbon emission from pig and cow manure input). Therefore, these farmers' activities are considered social data to validate the carbon offset in our project. In addition, the publication would include what type of farmers, kind of livestock, and other su-re.co activities will be synergized when we are selling carbon offset with the social co-benefits as mentioned.