

Climate Technology Centre and Network (CTCN) Technical Assistance

Technical Assistance (TA) project for the Organic fertilizer and Anaerobic digestion to produce biofuels technology for Vietnamese agricultural sector

**Central, Local Government and
affiliated Institutions Analysis and
Network Building for
Establishment of a Pilot Complex**

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The Climate Technology Centre & Network (CTCN) has provided Technical Assistance through pro-bono support from Ecosian and National Institute of Green Technology(NIGT) to implement the pre-feasibility study for the Organic fertilizer and Anaerobic digestion to produce biofuels technology for Vietnamese agricultural sector.

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1. Introduction

1.1 Activity Background

With the growth of the livestock industry in Vietnam, livestock wastes are also increasing. In 2018, the total solid wastes from the livestock industry in Vietnam was 62 million tons with liquid wastes of 63 million tons. At least 47% of families raising livestock were found to discharge livestock manure externally without any treatment procedures. Such inappropriate livestock manure control is giving rise to issues in terms of the health and hygiene of residents and national greenhouse gas reduction goals.

First, inappropriately treated or discharged livestock wastes can cause severe pollution such as in the soil and rivers, etc. near the towns, and such can clearly result in risks to public health and hygiene of residents. In addition, inappropriately managed livestock manure can promote the emission of greenhouse gases such as CH₄ and N₂O; thus wielding a negative impact on the national greenhouse gas inventory of Vietnam.

In order to address such issue, the Vietnamese government is looking to collect and treat large quantities of organic wastes generated in the livestock industry to produce biogas and organic fertilizers. In order to implement such new technologies smoothly, however, there must be policy bases such as laws and support policies first. Therefore, by suggesting incentive policies related to resourcing livestock manure and operating empowerment programs for the government stakeholders of Vietnam, activities to form the basis for operating livestock manure biogasification plants were conducted.

1.2. Main Outputs

The three major outputs of the execution of this activity are as follows:

- i) Form a network with Vietnamese government stakeholders
- ii) Review the support programs of the Vietnamese government and draw up proposals
- iii) Operate empowerment programs for Vietnamese government stakeholders

First, Ecosian formed a network with the stakeholders of Vietnamese government agencies through cooperation with MARD¹ and local corporations. Furthermore, discussions were held on the current policies related to turning livestock manure into resources and the need for operating new programs with Vietnamese government institutes, research agencies under the government, private companies, etc.

Ecosian reviewed and analyzed the current status of laws and policies related to turning livestock manure into resources of Vietnam and major countries abroad based on the policy statuses that were discussed. Based on this, proposals that can reinforce and supplement the current policies of Vietnam were drawn up.

¹ MARD: Ministry of Agriculture and Rural Development

According to such proposals, empowerment programs were operated for government stakeholders. The presenter was a hands-on worker who was directly involved in this TA project; in this empowerment program, the current programs on turning livestock manure into resources of Vietnam and major countries around the world were reviewed, and the deduced policy proposals were shared.

2. Stakeholder engagement

2.1 Construction of Stakeholder Network

Constructing a network with stakeholders such as government agencies and local engineering companies is essential for successful policy research in this TA project, which has three main objectives.

(1) Introduce the TA project to stakeholders at government agencies and share the objective and plans of the project.

(2) Understand the limitations of policies implemented previously in Vietnam and collect the opinions of government stakeholders on this.

(3) Draw up new policy plans based on additionally discussed issues

For the execution of this TA project, around 41 stakeholders were secured in government research institutes, universities, and private companies.

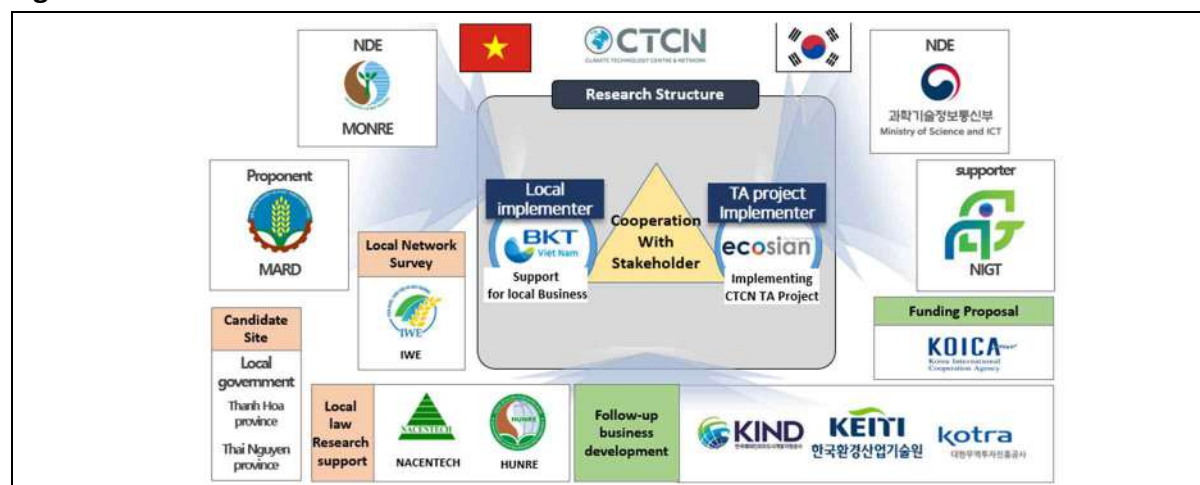
The types of each stakeholder and the purpose of securing them are as follows:

Table 1 Stakeholder Type and Purpose of Securing Them

Stakeholder Category	Purpose
Government agencies	Share the existing policies of Vietnam and enhance the promotion of support policies for biogasification plants of the government
Local government of the target area	
Government research agencies and universities	Share the latest regulations related to the byproducts (compost & liquid fertilizers) of biogasification plants and discuss the need for support programs
Employees of private engineering companies	Discuss the need for support programs for implementing biogasification technologies

Networking activities were carried out through activities such as government agency stakeholder meetings, expert meetings, capacity building events, etc.

Figure 1 Stakeholder Network



3. Analysis of Biogas Plant Laws and Policies

3.1 Purpose and Method of Reviewing Policies

In order to propose policies related to expanding biogas plants based on livestock manure in Vietnam, Ecosian analyzed similar strategies of other countries and drew up elements to benchmark. Vietnam's policy studies were conducted through meetings with the government agencies and local experts in Vietnam as well as local data investigations, and countries such as Korea and Germany, Denmark, and Netherlands of Europe were selected for benchmarking. The fact that Germany is the biggest producer of biogas and biomethane in Europe with the Netherlands and Denmark ranking second and third, respectively, in terms of biomethane production in Europe was considered for their selection.²

Korea is actively installing and operating livestock manure-based biogas plants to maximize biogas production. The laws and policies of Korea were analyzed to focus on reviewing policies worth considering in Vietnam, which is currently in the preparation stages of the plant.

Key countries in Europe have gone beyond the support stage for livestock manure-based biogas plants, and they are focusing on supporting the distribution of biogas-based electric power. By analyzing the laws and policies of the corresponding European countries, policies that could be considered after establishing the biogas production base were reviewed.

Analysis of laws and policies were carried out in three stages. First, the target production quantity of biogas established in Vietnam, Korea, and the EU was identified. Afterward, laws related to the installation and operation of plants by the state to achieve the production goal and support policies for this were analyzed. In addition, laws and support policies related to the utilization of byproducts produced through operation after the installation of plants were analyzed. Based on this, it aims at drawing up and proposing appropriate policies that can help the Vietnamese government effectively pursue the production of biogas.

① National target	
② Plant installation and operation support	③ Product utilization support
Laws	Laws
Support policies	Support policies

² KEITI (2022), Biomethane in Europe

3.2 Detailed Goals, Laws, and Support

3.2.1 Biogas Production Target

The Korean Ministry of Environment announced the biogas production target and detailed plans through the "Road Map of Bio/Water Energy Expansion Using Environmental Plants³." Through this road map, it was announced that Korea would increase biogas production—which was at 3.6Nm³ in 2015—by 40% to as much as 5.0Nm³ by 2026.

As detailed strategies for achieving the target, there are strategies of converting currently operating livestock manure treatment plants into biogas plants and strategy of installing new biogas plants. First, in order to convert existing plants, biogas production equipment (anaerobic digester, etc.) will be added to the livestock manure purification, compost, and liquid fertilizer treatment plants that are currently in operation. Next, in order to install new biogasification plants, integrated biogas plants that mix organic wastes to produce biogas will be actively encouraged. Furthermore, a new plant model will be developed, and an information system that can manage data such as biogas performance report, transactions, etc. will be constructed to provide an efficient system.

In conclusion, Korea plans to modify existing plants or build new ones to expand biogas plants. For this, it intends to engage actively in developing new technologies and management systems.

The European Commission set the biomethane gas production goal through the "REPowerEU Plan"⁴ and planned five areas of action. First, the biogas production goal was set at 35 billion m³ by 2030, and the action areas to achieve this are as follows: 1) Promote the sustainable production and use of biogas and biomethane at the EU and national/ regional level and the injection of biomethane into the gas grid. 2) Provide incentives for biogas upgrading into biomethane. 3) Promote the adaptation and adjustment of existing and the deployment of new infrastructure for the transport of increased shares of biomethane through the EU gas grid. 4) Address RND&I gaps 5) Access to finance by providing grants and loans.

In summary, the key strategy of the EU is to upgrade biogas to biomethane for production and consequently enhance its technology for creating high-quality energy. In addition, provision of financial support is planned to encourage production of biogas.

The Vietnamese government announced its decision to establish its renewable energy development strategy titled "Approving Vietnam's Renewable Energy Development

³ Republic of Korea Ministry of Environment, "Road Map of Bio/Water Energy Expansion Using Environmental Plants"

⁴ European Commission, 'REPowerEU Plan'

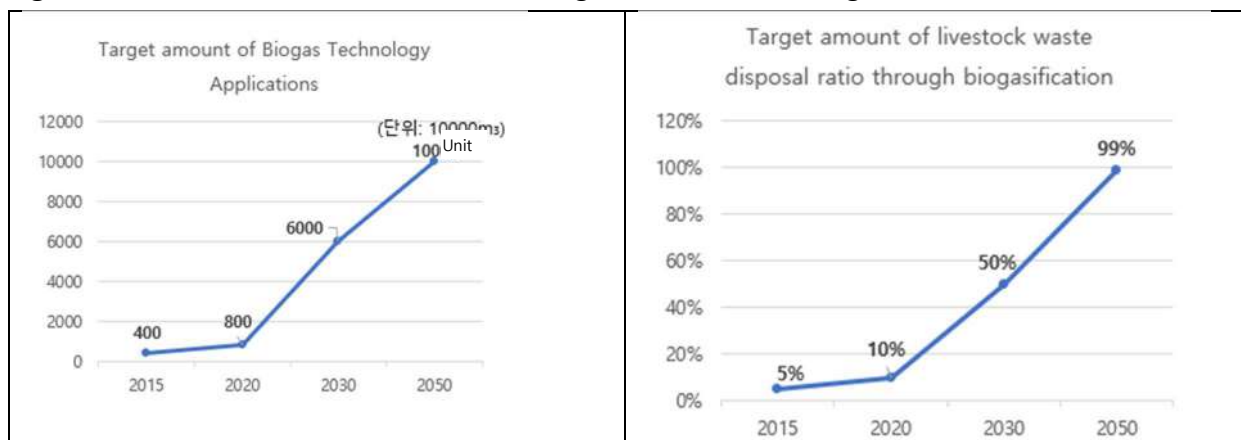
Strategy up to 2030, with an outlook to 2050⁵." This decision set the targets for livestock waste treatment rates through biogasification and the scope of application of biogas technologies for the entire nation by the Vietnamese government.

First, the target goal for applying biogas technologies in Vietnam was about 4 million m³ in 2015, and the scale of the biogas technology application gradually increased to about 8 million m³ in 2020; the aim is to reach about 60 million m³ in 2030 and 100 million m³ by 2050 to treat livestock wastes.

In addition, the percentage of using biogasification technologies for treating livestock wastes was about 5% in 2015 and 10% in 2020, and the goal is to raise this to about 50% by 2030. The ultimate goal is to treat 99% of livestock wastes with biogas technologies by 2050.

In summary, Vietnam established plans to increase biogasification technologies by 25 times by 2050 compared to 2015, and most of the livestock manure will be treated through biogas.

Figure 0.0 National Goals Related to the Biogasification Technologies of Vietnam



Source: Decision No. 2068/QĐ-TTg (2015), Approving Vietnam's Renewable Energy Development Strategy up to 2030, with an outlook to 2050

To summarize the biogas production goals of Korea, EU, and Vietnam, all of these nations established mid- to long-term goals and detailed strategies by 2030. As a leader in renewable energy technology, the EU aims at developing high-quality biomethane production technologies and biomethane usage technologies within the gas grid. Likewise, Korea and Vietnam plan to increase their production goals gradually by increasing biogas plants and utilizing strategies of actively using livestock manure as resources.

3.2.2 Biogas Plant Installation and Operation Support

The government's funding support for the installation and operation of plants in the implementation stage of advanced technologies can mitigate the financial risk that the business must bear in the early stage of the project, and can also establish the basis for the

⁵ Vietnam government, Decision No. 2068/QĐ-TTg, 'Approving Vietnam's Renewable Energy Development Strategy up to 2030, with an outlook to 2050'

stable operation of plants. For this, in order to propose policies according to the situation of Vietnam, the laws and support policies of Korea and Vietnam were analyzed. First, Korean and Vietnamese laws that recommend the application of livestock manure biogasification technologies or laws that explicate financial support for this were reviewed. In addition, support methods such as plant installation costs, operation costs, etc. provided by the state were analyzed.

(1) Korea

In Korea, the installation of biogas plants is recommended in the "Livestock Manure Resourcing Act"⁶ and "Biogas Promotion Act,"⁷ and the basis for subsidies for it was provided. Based on such laws, Korean government agencies implement three different support projects for livestock manure treating plants, biogas plant installation costs, and system installation costs within the plants.

Table 00. Laws on the Installation and Operation of Biogas Plants in Korea

Laws	Contents
Livestock Manure Resourcing Act	<p>The "Livestock Manure Resourcing Act" stipulates that livestock manure cannot be discharged without being treated first, and that treatment plants must be installed to turn it into resources, compost, or liquid fertilizers.</p> <p>This law prescribes that the head of the local government organization or agricultural cooperative can install public treatment plants for livestock manure, and that state funding can be provided to support the costs needed for installation.</p>
Biogas Promotion Act	<p>The "Biogas Promotion Act" was enacted in order to establish the necessary basis for the production and use of biogas using organic waste resources and consequently promote the eco-friendly use of organic waste resources.</p> <p>This law prescribes the responsible producer of biogas and levies production targets for them. In addition, the performance of other businesses can be purchased for achieving the goal, and penalties are levied if the goal is not reached. It states that state funding can be provided as financial support for them.</p>

First, the "Joint Resourcing Plant Support Project" for livestock manure of the Ministry of Agriculture, Food and Rural Affairs (MAFRA) is a support measure to promote resourcing of livestock manure and provide stable processing for resource circulation using various treatment methods according to local conditions.⁸ At this time, the definition of "Livestock

⁶ Korean law, "Livestock Manure Resourcing Act"

⁷ Korean law, "Biogas Promotion Act"

⁸ Republic of Korea MAFRA press release, "Promoting Carbon Neutrality through the Diversification of Treatment Methods such as Turning

Manure Joint Resourcing Plant" is a plant installed by public institutes or private businesses to treat livestock manure using various methods such as compost & liquid fertilizer treatment, purification, biochar, biogasification, fillet composting, etc. In this project, MAFRA installed or modified or renewed plants operated in the past to support plants and equipment for private companies, agricultural companies, public institutes, etc. that operate livestock manure joint resourcing plants.

Table 0. Korea's Livestock Manure Joint Resourcing Plant Support Project Support Rate

Category	National funding	Local government funding	Loan	Amount Paid
Compost, liquid fertilizer	40%	30%	30%	-
Bio-linking	40%	30%	30%	-
Turning into energy	50%	20%	20%	10%

Source: Republic of Korea MAFRA press release, "Promoting Carbon Neutrality through the Diversification of Treatment Methods such as Turning Livestock Manure into Energy"

Secondly, the "Livestock Manure Public Treatment Plant Support Project" is being overseen by the Ministry of Environment. The "Livestock Manure Public Treatment Plant" refers to public plants installed by the head of the local government organization or agricultural cooperative for turning livestock manure into biogasification, compost, and liquid fertilizer and for purification. Through this project, the Ministry of Environment aims at securing competitiveness by reducing livestock manure treatment costs of small livestock farms and securing the infrastructure for the economical and efficient handling of livestock manure. The Ministry of Environment provides installation subsidies for local governments installing this plant.⁹ Among public treatment plants, highest-priority support is given to livestock manure integrated biogas projects, and subsidies are given differently depending on the project executor and the scheduled date of completion.

Table 0.0 Korea's Livestock Manure Public Treatment Plant Support Project Support Rate

City, Gun, Gu	Metropolitan City (Gun region)	Metropolitan City	Agricultural Cooperative
80%	80%	60%	70%

Source: Republic of Korea Ministry of Environment, "2022 Livestock Manure Public Treatment Plant Budget Compilation and Execution Guidelines"

Lastly, the "Organic Waste Resource Integrated Biogasification Plant," which is another

Livestock Manure into Energy"

⁹ Ministry of Environment, 2022 Livestock Manure Public Treatment Plant Budget Compilation and Execution Guidelines

plant supported by the Ministry of Environment, is a plant that produces biogas through the integrated treatment of two or more types of organic wastes such as food wastes, livestock manure, sewage, etc. While single-waste digestion plants have a digestion rate of only 35%, integrated biogasification plants have digestion efficiency of over 55%; thus having the advantage of being able to reduce plant operation costs effectively. The Ministry of Environment will support the design costs and general system ISP construction costs in the first year of the project and the design costs in the second year of the project for local governments intending to install this plant.¹⁰ . This is a pilot project that first began in 2022.

Table 00. Korea’s Organic Waste Integrated Biogasification Plant Support Project Subsidy

Category	2022년	2023년	Fluctuation
Budget	12 million KRW (approx. 940,000 USD)	69.99 million KRW (approx. 5.48 million USD)	+5,499 (458%)
Support breakdown	Survey costs for 4 sites X 300 million KRW (approx. 230,000 USD)	(Continuing projects) Design cost for 4 sites x 1.3 billion KRW (approx. 1.01 million USD) (New projects) Survey costs for 4 sites X 300 million KRW (approx. 230,000 USD) (General system) ISP X 200 million KRW (approx. 150,000 USD)	-

Source: Republic of Korea Ministry of Environment press release, "2023 Ministry of Environment Budget Plans Focus Investments in Safety, Environmental Services, and the Future"

(2) Vietnam

Vietnam’s MARD regulates the livestock waste treatment method in the "Guidelines for the collection and treatment of animal husbandry wastes and agricultural by-products to be reused for other purposes¹¹." In addition, the government provided the basis for supporting subsidies for installing biogas plants in the "policies on subsidies for improvements in farmer household animal husbandry in 2005-2020 period¹²." Pursuant to this law, Vietnam’s MARD supported subsidies for domestic-use biogas plant until 2020. Subsidies are also being provided through the support of foreign organizations since 2003 up to present.

Table 00. Laws on the Installation and Operation of Biogas Plants in Vietnam

Laws	Contents
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¹⁰ Ministry of Environment press release, "2023 Ministry of Environment Budget Plans Focus Investments in Safety, Environmental Services, and the Future"

¹¹ MARD, (2021) ‘Guidelines for The collection and treatment of animal husbandry wastes and agricultural by-products to be reused for other purposes’

¹² The Prime Minister (2014), ‘Polices on subsidies for improvements in farmer household animal husbandry in 2005-2020 period’

<p>Guidelines for The collection and treatment of animal husbandry wastes and agricultural by-products to be reused for other purposes</p>	<p>In these guidelines, the handling method of organic waste generated in livestock farms is regulated by categorizing into solid wastes and wastewater.</p> <p>In the case of solid wastes, one of the three methods of compost, biogasification, and use for growing crops must be selected for handling. In the case of organic wastewater, one of three methods such as biogasification, biopond, and biological treatment that minimizes odors must be selected for handling.</p>
<p>Polices on subsidies for improvements in farmer household animal husbandry in 2005-2020 period</p>	<p>This law prescribes the subsidies supported when handling livestock wastes at the household. The law stipulates that 50% of installation costs can be supported once for those installing domestic-use biogas plants.</p>

Ecosian learned the details of the biogas plant support by the Vietnamese government through a kick-off meeting with government agency stakeholders held by MARD. According to the stakeholder, Vietnam has been installing biogas plants with the aid of the international community, and the government used to provide subsidies for small-scale plants.

In order to encourage the installation of biogas plants when treating livestock manure, the Vietnamese government implemented subsidy policies¹³ to improve farm livestock from 2015 to 2020. The target of this support policy is businesses intending to construct livestock waste biogasification plants or livestock manure biological treatment plants. The government offered one-time support of up to 50% of the amount required for constructing the biogas plant to treat livestock waste, or about 5 million VND (approx. 210 USD) per project household. Statistics on the performance of this support policy has not been announced to date. According to a speaker at the meeting, since it is implementing this subsidy policy, MARD plans to provide support policies in the future.

Meanwhile, subsidy support by overseas organizations has been ongoing every year since 2003. Dutch NGO SNV has been supporting the installation of small-scale biogasification plants¹⁴ in rural Vietnam. The support mobilized funds of the Dutch DGBEB (Directorate-General for Foreign Economic Relations) and aimed at resolving the environment, health, and energy supply issues in Vietnam by utilizing biogas technologies. In this program, subsidies accounting for about 10% of the biogas plant installation costs have been supported. As a result, over 150,000 domestic-use biogas digesters were installed in 55 areas in Vietnam as of 2017. Through this, approximately 800,000 tons of CO₂ were mitigated, and access to clean

¹³ 50/2014/QĐ-TTg, September 04 2014. POLICIES ON SUBSIDIES FOR IMPROVEMENTS IN FARMER HOUSEHOLD ANIMAL HUSBANDRY IN 2015 – 2020 PERIOD

¹⁴ <https://snv.org/project/vietnam-biogas-programme>

energy was improved for over 790,000 Vietnamese residents in farming areas.

In conclusion, both the Korean and Vietnamese governments emphasized the need for turning livestock manure into resources through laws on expanding plants in the early biogas market and provided the basis for support policies. In the case of subsidy policies for installing plants, however, there are some differences. In Korea, subsidies are being provided to large-scale public and private plant businesses under the leadership of government agencies, whereas the Vietnamese government pays out subsidies to farmers that install small-scale plants.

Table 00. Biogas Plant Installation and Operation Support Policies of Korea and Vietnam

Biogas Plant Installation and Operation Support		
Country	Korea	Vietnam
Support policies	<ul style="list-style-type: none"> - Livestock manure public treatment plants - Integrated biogasification plants - Joint resourcing plants 	<ul style="list-style-type: none"> - SNV - Subsidies for small-scale plants

3.2.3 Support for Utilization of Products from Biogas Plants

Three European countries (Denmark, Germany, Netherlands), Korea, and Vietnam reviewed laws and support policies so that products from biogas plants can be utilized. After advanced plants were implemented, policies supporting the utilization of products by the government can offset the financial risk borne by the business when operating plants with revenue. In the case of biogas plants, the main products are biogas, compost, and liquid fertilizer, and it is common for the support policies to support the supply of such products.

Analysis was conducted on whether the grounds for support of products such as biogas, compost, and liquid fertilizers are provided through a review of state laws. In addition, through the review on support policies, the method of supporting subsidies including whether there was a move by the government to promote the market distribution of products by biogas plants, even if there was no direct financial support, was analyzed.

(1) Denmark, Germany, and Netherlands of Europe

FiT (Feed-in-Tariff) and FiP (Feed-in-Premium) systems, which ensure the cost of biogas as the product of biogas plants, are implemented in many countries in Europe. Denmark, Germany, and Netherlands also support this program in order to overcome the price differences between electricity based on fossil fuels and electricity based on renewable energy. First, FiT adds subsidies by taking the relatively higher fixed purchase price regardless of the market price in the event that the market price of the produced electricity is lower than the base price reflecting the standard cost per energy source. This aims at promoting the distribution of renewable energy. FiP is a system that applies the method of adding subsidies by adding premiums to market prices when selling biogas at market prices. This aims at going beyond promoting the distribution of renewable energy but also making it independent in the market in order to implement it in the free market system.

The three countries introduced or prescribed FiT/FiP through laws and systems related to renewable energy. Denmark and Germany used the "Law on the Promotion of Renewable Energy¹⁵" and "EEG" (Erneuerbare-Energien-Gesetz)¹⁶, respectively, and the Netherlands, "SDE++: Stimulating Duurzame Enerietransitie"¹⁷ to disclose standards and bases for supporting eco-friendly subsidies for renewable energy technologies.

Table 00. Laws on Products (Biogas) of Biogas Plants in Europe

Law / System	Contents
[Denmark] Law on the Promotion of Renewable Energy	This law stipulates that it is possible to apply the FiP system in sectors such as wind power and biogas to promote the use of renewable energy.

¹⁵ Denmark, 'Law on the Promotion of Renewable Energy'

¹⁶ Germany, 'EEG: Erneuerbare-Energien-Gesetz'

¹⁷ Netherlands Enterprise Agency, 'SDE++: Stimulating Duurzame Enerietransitie'

[Germany] EEG'(Erneuerbare-Energien-Gesetz)	This law provided the basis for supporting the storage and handling of livestock manure, and it clearly states the need to provide subsidies for biogas plants based on livestock manure. It also provides information on the tariff level when applying FiP and FiT.
[Netherlands] SDE++: Stimulating Duurzame Enerietransitie	This stipulates the standards and bases for supporting eco-friendly subsidies for renewable energy technologies. In addition, it provides information on the amount of support through the FiP system.

Even within Europe, there are different energy sources included in the category for support of FiT and FiP for each nation, and Denmark, Germany, and Netherlands applied the two support systems to electricity based on biogas using livestock manure. The premium of FiP supported in Denmark is divided by the variable premium that changes according to the market price and the fixed premium that does not change. Germany implements the FiT and FiP systems for small-scale biogas plants less than 75Kw in scale. The Netherlands applies variable premium systems among FiP. The maximum premium is supported differently according to the scope of the plant and technology.

Table 00. FiT and FiP Systems for Livestock Manure-based Biogas of European Countries

Country	Support Type
Denmark	Can apply variable premium or fixed premium types among FiP according to the situation - Variable premium: Market price + market variable premium price - Fixed premium: Market price + fixed premium price
Germany	Implements the FiT and FiP systems for small-scale biogas plants less than 75Kw in scale
Netherlands	Operates the variable premium system among FiP; the maximum premium paid differs depending on the scope of the plant and technology

Source: LEGAL SOURCES ON RENEWABLE ENERGY (<http://www.res-legal.eu/home/>)

(2) Korea

Korea implements projects that support spraying costs for distribution organizations that spray compost and liquid fertilizer by MAFRA based on the "Livestock Manure Act"¹⁸.

Table 00. Laws on Products (Compost, Liquid Fertilizer) of Biogas Plants in Europe

Laws	Contents
Livestock Manure Resourcing Act	The "Livestock Manure Resourcing Act" stipulates that livestock manure cannot be discharged without being treated first, and that treatment plants must be installed to turn it into resources, compost, or liquid fertilizers. This law stipulates the financial and technological support for promoting the distribution of compost and liquid fertilizers.

¹⁸ Korean law, "Livestock Manure Act"

According to the Livestock Manure Act, the mayor, town head, or borough head can organize a distribution group to promote the operation of compost and liquid fertilizer distribution groups. Financial and technological support can also be provided for them. Compost & liquid fertilizer spraying cost support projects are being implemented under the supervision of MAFRA.

Korea's MAFRA oversees the "Compost & Liquid Fertilizer Spraying Expense Support Project,"¹⁹ which provides different supports for spraying costs according to the spraying area for distribution organizations that spray compost and liquid fertilizer to farms after establishing plans on the use of livestock manure compost & liquid fertilizers. This project aims at preventing environmental pollution such as soil and water while promoting livestock manure compost & liquid fertilizers by appropriately handling livestock manure. This support project is operated by designating the compost and liquid fertilizer spray quantity per area (ha). Subsidies are provided differently for spraying costs based on the inspection results of the operation status of the livestock manure resourcing organization.

Table 0.0 Support Amount (USD/ha) according to the Operation Status Results during Compost & Liquid Fertilizer Spraying Support Projects in Korea

Grade A	Grade B	Grade C
300	200	100

Source: Republic of Korea Ministry of Agriculture, Food and Rural Affairs, "2023 Livestock Manure Handling Support Project Execution Guidelines"

(3) Vietnam

Ecosian attempted to learn the latest policies of Vietnam, which aims to promote biogas and compost & liquid fertilizers, through an expert meeting with Vietnamese science technology research institute Nacentech²⁰. The results of the meeting with Nacentech revealed that there are two very recent laws announced by MARD in order to establish the basis for expanding organic fertilizers in Vietnam. MARD provided a written decision containing the goal of expanding production of organic fertilizers and established national technology regulations that can promote the activation of compost & liquid fertilizer markets.

Table 00. Laws on Products (Compost, Liquid Fertilizer) of Biogas Plants in Vietnam

Laws	Contents
Action Plan to implement the increase	According to the written decision ²¹ , plans are to increase the distribution ratio of organic fertilizers to 25% of all fertilizers by

¹⁹ Republic of Korea Ministry of Agriculture, Food, and Rural Affairs, "2023 Livestock Manure Handling Support Project Execution Guidelines"

²⁰ Nacentech(National Center For Technological Progress) research and apply advanced technologies, organizing the transfer of technologies to meet the requirements of the market.

²¹ Vietnam MARD, NO. 4324/QD-BNN-BVTV, 'Action Plan to implement the increase in production and use of organic fertilizers, using economical, reasonable and effective use of fertilizers for the period 2022-2025'

in production and use of organic fertilizers, using economical, reasonable and effective use of fertilizers for the period 2022-2025	2025. For this, it aims at diversifying organic fertilizer products and developing organic fertilizer production technologies. In addition, it will hold education on the use of fertilizers annually for local residents and fertilizer businesses through local governments.
National technical regulation on livestock wastewater used for crops	In the 2022 national technical regulations ²² , the past standards for using livestock wastewater as organic fertilizer for crops were updated. According to the updated regulations, the indicators of BOD, COD, nitrogen, etc. were deleted, and the pH and colon bacillus standards were lowered. Ultimately, they can be said to have been eased compared to prior regulations.

First, according to the written decision²³ announced by MARD in November 2022, plans are to increase the distribution ratio of organic fertilizers to 25% of all fertilizers by 2025. For this, it aims at diversifying organic fertilizer products and developing organic fertilizer production technologies. In addition, it will hold education on the use of fertilizers annually for local residents and fertilizer businesses through local governments.

Then in December 2022, MARD announced the national technical regulations²⁴ indicating the standards for livestock wastewater that can be used as organic fertilizer for crops. In these regulations, the livestock wastewater discharge standards were set according to the limit value of pH, acidity, heavy metal concentration, colon bacillus count, etc. Compared with the national technology regulations announced in 2016, indicators such as BOD, COD, and nitrogen were deleted, and heavy metal concentration indicators such as arsenic and cadmium were added. In addition, pH and colon bacillus standards, which are indicators that were maintained in the same way, were lowered. In conclusion, the livestock wastewater standards updated in 2022 can be said to have been eased compared to earlier regulations. According to a member of Nacentech, the fact that the crop usage standards of livestock wastewater were lowered suggests that it has become easier to use livestock manure-based organic wastewater as liquid fertilizer on crops. According to the recent law, if the distribution of compost and liquid fertilizer becomes activated in Vietnam, it will be easier to generate additional profits for compost and liquid fertilizer produced through the operation of the biogas plants.

²² Vietnam MARD, QCVN 01-195:2022/BNNPTN, 'National technical regulation on livestock wastewater used for crops'

²³ Vietnam MARD, NO. 4324/QĐ-BNN-BVTV, 'Action Plan to implement the increase in production and use of organic fertilizers, using economical, reasonable and effective use of fertilizers for the period 2022-2025'

²⁴ Vietnam MARD, QCVN 01-195:2022/BNNPTN, 'National technical regulation on livestock wastewater used for crops'

Table 00. Livestock Wastewater Parameter Limits according to the 2022 National Technical Regulations in Vietnam

No	Parameter	Unit	Limit value
1	Ph	-	5.5-9
2	Chloride ion	mg/l	≤ 600
3	Arsenic	mg/l	≤ 0.1
4	Cadmium	mg/l	≤ 0.01
5	Chromium	mg/l	≤ 0.5
6	Mercury	mg/l	≤ 0.002
7	Lead	mg/l	≤ 0.05
8	Coliform bacillus	MPN or CFU/100ml	≤ 200

Source: Vietnam MARD, QCVN 01-195:2022/BNNPTN, ‘National technical regulation on livestock wastewater used for crops’

Table 00. Livestock Wastewater Parameter Limits according to the 2016 National Technical Regulations in Vietnam

No	Parameter	Unit	C Value	
			A	B
1	Ph	-	6-9	5.5-9
2	BOD	mg/l	40	100
3	COD	mg/l	100	300
4	Total Suspended Sediments	mg/l	50	150
5	Nitrogen	mg/l	50	150
6	Coliform bacillus	MPN or CFU/100ml	3000	5000

Source: Vietnam MARD, QCVN 01-195:2022/BNNPTN, ‘National technical regulation on livestock wastewater used for crops’

In conclusion, Denmark, Germany, Netherlands, and Korea provided the basis for supporting the product supply price by law in order to reduce the financial risks for operating biogas plants. Based on the analysis, the three European countries are actively supporting biogas supply costs and Korea is supporting the distribution of compost and liquid fertilizers. In the case of Vietnam, the existing national technical regulations were recently updated to ease the standards for using livestock wastewater on crops. This suggests that in the future, it will be possible to enhance the economic feasibility of installing biogasification plants by expanding the distribution of liquid fertilizer as one of the products of biogas plants.

Table 00. Biogas Product Utilization Support Policies of Biogas of European Nations, Korea, and Vietnam

Biogas plant product utilization support			
Country	3 European countries	Korea	Vietnam

Support policies	- FiT & FiP (Feed-in-Tariff & Feed-in-Premium)	- Compost & liquid fertilizer spray support project	-
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4. Capacity Building Event

4.1 Summary of the program

The capacity building event was an event for sharing policy proposals for the stakeholders of the Vietnamese government. In this event, laws and support policies related to the biogas plants of Korea, European countries, and Vietnam, which were analyzed through stakeholder meetings and literary studies, were shared. Based on the results of the analysis, policies that can be applied to the current situation of Vietnam were proposed.

The capacity building event was carried out in order of introducing the TA project, sharing the results of analyzing Korean and European policies, sharing the results of Vietnam's policies, and proposing policies for Vietnam.

4.2 Opening Remarks

[Mrs. Hoa, Department of Livestock Production, Ministry of Agriculture and Rural]

Ms. Hoa expressed appreciation to those attending the event and introduced the theme of the main program. This capacity building event was carried out with the goal of enhancing capacities on policies related to the eco-friendly utilization of livestock manure, eco-friendly composting, and biogas generation in Vietnam. She expressed hopes for the development of Vietnam's biogasification policies and technologies through this event. She ended her speech by expressing her wish for the successful completion of the day's program.

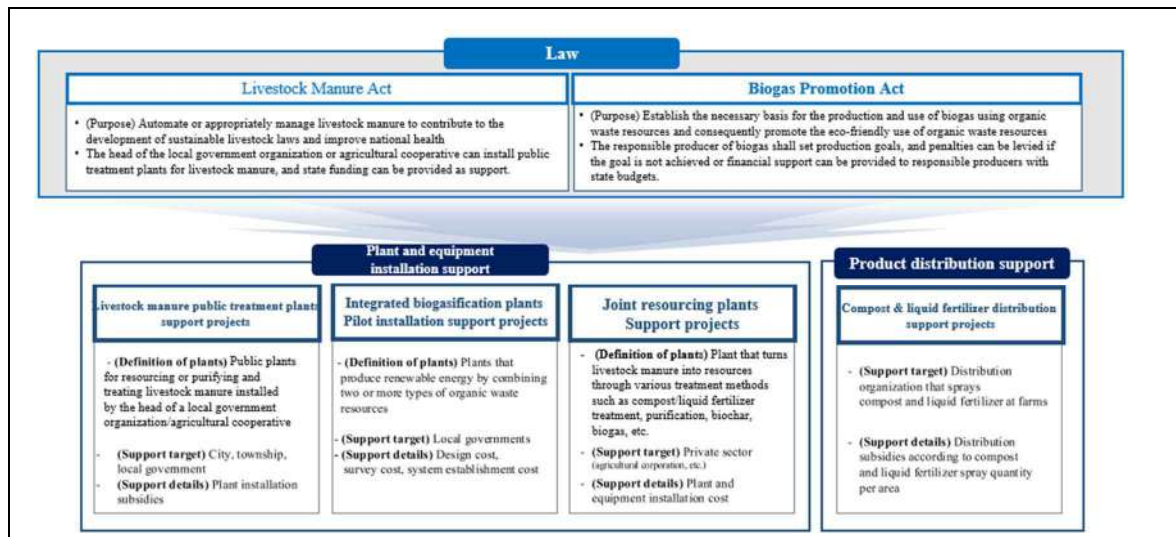
4.3 Policy Investigation and Analysis Results

[Mr. Yoon, Head of Division, Director, Ecosian]

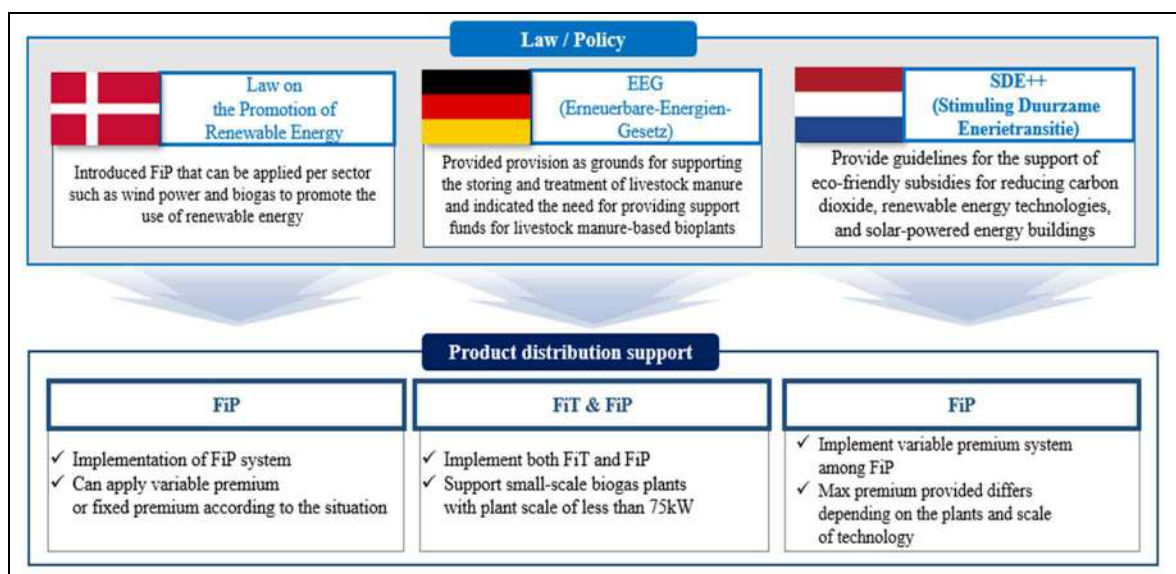
According to Mr. Yoon, Ecosian analyzed policies related to biogas plants in Korea, Europe, and Vietnam and said that the contents would be shared with the participants of the capacity building event.

First, the reasons for selecting those countries for review in order to draw up the policy plans for Vietnam were as follows: First, the laws and policies of Korea were analyzed to focus on reviewing policies worth referring to in Vietnam, which is currently in the preparation stages of the plants. In the case of Europe, Denmark, Germany, and the Netherlands are focusing on supporting the distribution of biogas-based electric power. By analyzing the laws and policies of these European countries, policies that could be considered after establishing the biogas production base were reviewed. By referring to the successful cases of advanced nations, Vietnam will be able to come up with better strategies for developing a sustainable and efficient biogas market.

In the case of Korea, the grounds for supporting the installation and operation of plants were stipulated by the "Livestock Manure Act" and the "Biogas Promotion Act," and government agencies established four subsidy policies. Subsidy policies can be divided into support for installing plants and support for distributing compost & liquid fertilizers produced from the plants. The Ministry of Environment supports public plant subsidies and MAFRA provides support for subsidies of public and private plants as well as for compost & liquid fertilizer distribution.



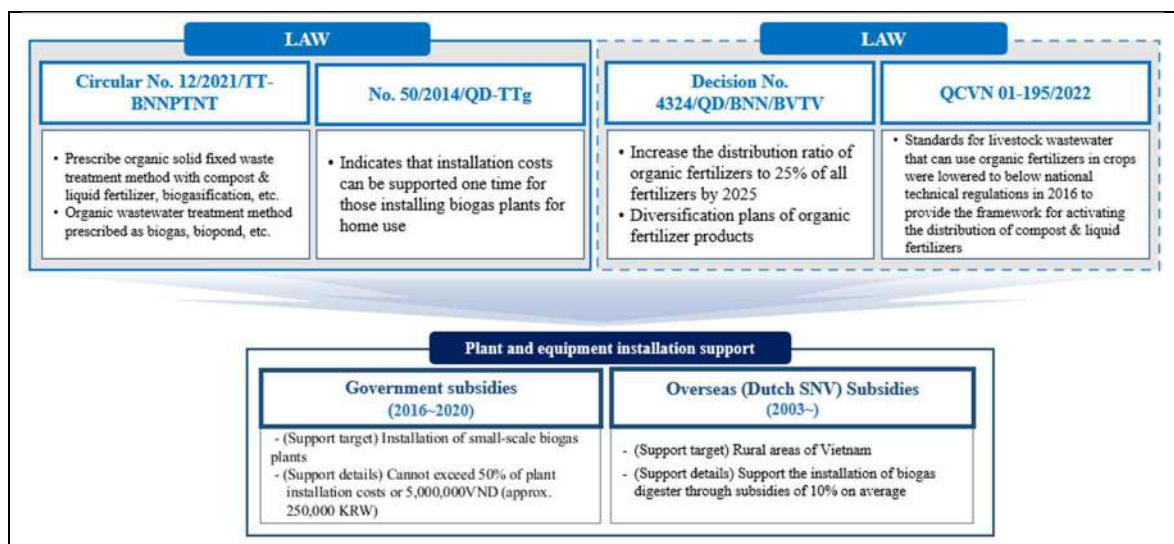
Next, among European countries, Denmark, Germany, and the Netherlands established the grounds for supporting subsidies related to renewable energy in different laws and systems. Denmark established the grounds for supporting the use of biogas, which is a main product of biogas plants, through the "Law on the Promotion of Renewable Energy," Germany, with the "EEG" Act, and the Netherlands, with the "SDE++: Stimulating Duurzame Enerietransitie" policy. They support the supply cost for electricity made with livestock manure-based biogas through the renewable energy support policies of FiT/FiP.



- Vietnam recommends turning livestock manure into resources through the "Decree for Solid Waste Management" and "Guidelines for the collection and treatment of animal husbandry wastes and agricultural by-products to be reused for other purposes," prescribing the handling method of organic wastes in livestock farms. The "Decree on Providing for Incentives and Supports for Environmental Protection Activities" established the basis for supporting subsidies for those involved in livestock manure eco-friendly handling activities.

In addition, the basis for the active distribution of compost and liquid fertilizer was established through the national technical regulations "National technical regulation on livestock wastewater used for crops" and "Action plan to implement the increase in production and use of organic fertilizers, using economical, reasonable and effective use of fertilizers for the period 2022-2025."

Subsidy policies were implemented with the support programs of the Vietnamese government and Dutch NGO. The Vietnamese government supported the installation costs for plants for five years from 2015 to 2020. In addition, the Dutch NGO SNV has been supporting costs for installing small-scale biogas plants in the rural areas of Vietnam since 2003.



4.4 Vietnamese Policy (Plan) Suggestion

Ecosian analyzed the laws and policies related to the livestock manure biogasification of Vietnam, Korea, and European countries and shared policy suggestions for Vietnam through this.

. This suggestion was established by referring to the various policies implemented by different countries to promote the production of livestock manure-based biogas. Considering the fact that the policies differ by country depending on the maturity of its biogas market, the new policies of Vietnam are proposed by categorizing into two different sets.

As biogasification plants are operated only with funds by supplying installation subsidies and products, the difficulty in securing economic profits becomes an issue.

First, in the initial stage of operating biogas plants, the business will have to bear the high costs of installation and operation. Thus, under such circumstances, we would like to propose support policies for the installation and operation of biogas plants in Vietnam.

If subsidy support for the installation and operation of plants goes smoothly and biogas plants spread in Vietnam, it will be necessary to consider developing support measures for utilizing the products of plants. We would like to propose policies for activating the biogas and compost & liquid fertilizer market as policies that can be considered for mid- to long-term stages.

This suggestion can be applied as an example that can be considered when establishing support policies for achieving the biogas production goals by the Vietnamese government.

Initial biogas plant implementation stage	Mid- to long-term stage after spreading and stabilizing plants
Plant installation and operation support	Product utilization support

First, as a support policy for the initial stages of the biogas market, implementing large-scale joint treatment plant installation subsidy policies and livestock manure collection fee policies can be considered.

Policies that support subsidies for businesses intending to install large-scale joint treatment plants can help reduce initial expenses. By doing so, construction of large-scale biogas plants can be promoted in various areas around Vietnam. The manure collection fee policy is a policy for farm operators that discharge livestock manure to pay manure collection fees to large-scale joint treatment plant businesses. This policy can help businesses generate additional profits while operating the plant.

Such policies can not only ease the burden of handling livestock manure for small-scale livestock farms by expanding large-scale joint treatment plants but also minimize financial risks for businesses considering the installation of biogas plants. In addition, such policies can help construct a stable system for the biogas industry in Vietnam and consequently promote the large-scale production of biogas.

Next, as a support policy for the mid- to long-term stage of the biogas market, the implementation of electricity supply support policies and organic compost and liquid fertilizer spraying subsidy policy can be considered.

The electricity supplier support policy is a method of supplying electricity based on biogas using livestock manure at higher prices than market prices. For example, FiT and FiP systems can be implemented, and this will promote the distribution of biogas based on market competition systems. The policy for providing subsidies to companies intending to spray organic compost and liquid fertilizers can encourage the use of eco-friendly fertilizer and enhance the quality of crops. This can also promote the circulation of waste resources.

Likewise, mid- to long-term policies are proposed to activate the distribution of outcomes of biogas plant operation and are expected to be implemented after biogas plants and technologies are expanded stably. Through these two policies, Vietnam will be able to realize sustainable agriculture and build the basis for a stable renewable energy market.

Plant installation and operation support	Product utilization support
Large-scale joint treatment plant installation subsidies	Biogas-based electricity supply cost support using livestock manure
Manure collection fee system	Organic compost and liquid fertilizer distribution support

5. Feedback survey

5.1 Purpose of survey

Surveys were conducted to examine whether understanding and capacity building for biogasification plant policies were achieved through the program and to ask about the overall satisfaction with the program composition.

5.2 Methodology

In April 2023, surveys were carried out for Ooaudd, a local stakeholder in Vietnam that participated in the capacity building program.

CTCN's "Training Evaluation Form" was used for the survey and was composed of 4 evaluation indicators and a total of 10 questions. The evaluation indicators were categorized as (I) Understanding, (II) Capacity Building, (III) Overall Satisfaction, and (IV) Knowledge Improvement.

For the eight questions in (I) Understanding, (II) Capacity Building, and (III) Overall Satisfaction, the 5-point scale (Likert Scale) was applied; for the two questions in (IV) Knowledge Improvement, the method of applying a four-point scale was applied.

(I) Understanding evaluation assessed the level of contribution to improving understanding of biogasification plants and relevant policies through the capacity building program.

(II) Capacity Building evaluation assessed the level of contribution to work utilization and possibility of sharing this experience with colleagues through the capacity building program.

(III) Overall Satisfaction evaluation assessed the program's composition suitability, program time, question and discussion time, and overall satisfaction.

Lastly, (IV) Knowledge Improvement evaluation assessed the existing knowledge level of participants and level of enhancing knowledge on policies related to biogasification plants through this capacity building program.

5.3 Survey Results

5.3.1 Survey Participants' Statistics

A total of 47 participants participated in this survey with men constituting 62% and women accounting for 38%. In examining the affiliation of the participants, there were two government agencies, ten private institutes, two universities and research institutes, and one local government.

The statistics of participants are as shown in the table below.

Table 4.0 Survey Participants' Statistics

Category		Value	Unit
No. of participants		47	person(s)
Gender	M	29(62%)	Persons (%)
	F	18(38%)	Persons (%)
Affiliation Type	Government agencies	2	No. of institutes
	Private sector	10	No. of institutes
	Non-governmental	0	No. of institutes
	Research institute, University, Laboratory	2	No. of institutes
	Local government	1	No. of institutes
	Etc.	0	No. of institutes

5.3.2 Survey Result Analysis

After completing the capacity building program, survey results were collected from 47 local stakeholders and divided into a five-point scale ((I) Understanding, (II) Capacity Building, (III) Overall Satisfaction) and four-point scale ((IV) Policy Knowledge Improvement) to analyze the positive responses²⁵.

First, in analyzing the statistics of the five-point scale, the positive response on Understanding evaluation was 91.49%; it was 93.62% for capacity building and 96.3% for overall satisfaction. Upon tallying this, it was found that 94.4% of participants had positive evaluation scores for the capacity building program regarding the eight questions. As a result, the evaluation for this capacity building

²⁵ For the 5-point scale, "Agree" (4 points) and "Strongly agree" (5 points) were deemed positive responses; in the case of four-point indicators, "Somewhat increased" (3 points) and "Significantly increased" (4 points) were deemed to be positive responses.

program was positive.

Questions	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)	Percentage of 4&5 points
I. Understanding						
I-1. The training contributed to my understanding of the biogas plant.	0	0	3	25	19	93.62%
I-2. The training contributed to my understanding of the necessity of similar policy.	0	0	5	21	21	89.4%
II. Capacity Building						
II-1. The training received is useful in relation to my work and capacity building.	0	0	3	27	17	93.62%
II-2. The training enabled me to share professional experiences with colleagues.	0	0	3	26	18	93.62%
III. Overall Satisfaction						
III-1. The format of the training was well suited to the learning objectives.	0	0	4	22	21	91.5%
III-2. The length of the training was adequate for the objectives and content.	0	0	1	26	20	97.9%
III-3. The training allowed adequate time for questions and discussions.	0	0	2	25	20	95.7%
III-4. Overall, I am satisfied with the training provided.	0	0	0	26	21	100.0%
Total	47					
Rate of evaluation of over 4 points	94.4%					

Next, in analyzing the statistics of the 4point scale, the level of knowledge possessed by participants prior to participating in this workshop was 2.4 out of 4, with most having understanding levels of some or good prior. The positive response for evaluating the policy knowledge improvement after participating in this workshop was found to be 93.6%.

In conclusion, in carrying out capacity building programs for participants having higher than basic knowledge on policies related to biogasification plants, it was found that 93.6% of participants saw knowledge improvement.

IV. Knowledge			
IV -1. Please indicate your previous level of knowledge on the biogas plant policy addressed in the training.			
No prior understanding (1)	Some prior understanding (2)	Good prior understanding (3)	Very good prior understanding (4)
5	20	20	2

IV -2. Please indicate your level of knowledge increase on the biogas plant policy addressed in the training.

Not increased (1)	Moderately increased (2)	Somewhat increased (3)	Significantly increased (4)
0	3	37	7
Total		47	
Rate of evaluation of over 3 points		93.6	

6. Conclusion

This policy analysis and capacity building event was carried out by analyzing the policies related to biogas in Korea, EU nations, and Vietnam, in order to share the results with stakeholders of government agencies. At this time, the laws and policies of Vietnam were obtained through networking with government stakeholders, and the final policy proposals were secured through additional desk research and analysis.

The capacity building program was operated for stakeholders under the central government and local governments in Vietnam. Through each presentation given by the TA project representative, they gained understanding of the laws and support policies related to biogas plants being implemented in Korea and European countries. Furthermore, support policies that can be deduced in Vietnam were proposed based on numerous examples of other countries.

In this activity, too, following the capacity building program, surveys were used to verify the capacity building performance of the program.

As a result, 94.4% of participants were satisfied overall with the program such as capacity building, with 93.6% responding that they gained more knowledge on policies related to livestock manure biogasification. Therefore, awareness of the target stakeholders can be deemed to have increased regarding biogasification policies.

Through such activities, Vietnamese government stakeholders can consider supporting subsidies when developing policies for increasing biogas production in the future. It is expected that, in the early stages of implementing biogas plants, they can consider support policies for plants and operation costs and, once the biogas market is stabilized, review policies for supporting the distribution of biogas and compost & liquid fertilizers as the outcomes of operation.

Vietnam composting of livestock manure and biogas power plant generation Capacity Building program

Session 1. Biogas Plant Policy in Korea

No	Name	Gender	Affiliation		Position	E-mail	Signature
			Organization	Category			
	Example	Male/ Female		a) Government agencies b) Private sector c) Non-governmental d) Research institute, University, Laboratory e) Local government		abc@gmail.com	
14	Nguyễn Hải Thủy	M	Sinh viên HVNN		student	hinhungyen@gmail.com	
15	Nguyễn Hải Cường	M	Sinh viên HVNN		student	nguyenhain71@gmail.com	
16	Lê Quý Kha	M	Liên hệ HTQT VN Chuyên gia Sinh viên HVNN		Visiting	lquykha@gmail.com	
19	Nguyễn Thị Minh Thu	F	Sinh viên HVNN		student	ntth75073@gmail.com	
20	Le Thanh Huyền	F	Khoa Môi trường Trường ĐHTN & MTHN		Lecturer	lethanh@hvre.edu.vn	
21	Nguyễn Xuân Lan	F	Khoa Môi trường Trường ĐHTN & MTHN		Lecturer	nxlan@hvre.edu.vn	
22	Nguyễn Ngọc Khánh	M	BTC				
23	Nguyễn Hồng Đăng	M	ĐHTN & MTHN		Lecturer	hongday_mt@hvre.edu.vn	

Vietnam composting of livestock manure and biogas power plant generation Capacity Building program

Session 1. Biogas Plant Policy in Korea

No	Name	Gender	Affiliation		Position	E-mail	Signature
			Organization	Category			
	Example	Male/ Female		a) Government agencies b) Private sector c) Non-governmental d) Research institute, University, Laboratory e) Local government		abc@gmail.com	
24	Eunjin So	F	KOTRA	a	Director		
25	Nguyễn Quang Hùng	M	CTY TNHH MTV T.Đông Khối Phát Nguyễn		Chủ trì kỹ thuật		
26	Nguyễn Việt	M	CTY TNHH MTV Đông Khối Phát Nguyễn		Chủ trì kỹ thuật		
27	Nguyễn Cường	M	CTY TNHH MTV Đông Khối Phát Nguyễn		Chủ trì kỹ thuật		
28	Nguyễn Văn Hải	M	Chi cục môi trường T.Đông		Phó T.P		
29	Lê Tiến Dũng	M	Viện chăn nuôi		Chủ trì kỹ thuật		
30	Đặng Công Hoàn	M	Cục CN		PTP		
31	Huang Thi Thuy	F	Cục CN		chuyên viên		

Vietnam composting of livestock manure and biogas power plant generation Capacity Building program

Session 1. Biogas Plant Policy in Korea

No	Name	Gender	Affiliation		Position	E-mail	Signature
			Organization	Category			
	Example	Male/ Female		a) Government agencies b) Private sector c) Non-governmental d) Research institute, University, Laboratory e) Local government		abc@gmail.com	
5	Tên: Thị Hằng Họ: Lê Văn		Cục chăn nuôi Hội viên NUVN		chuyên viên Giáp viên	tenh.thihanh88@gmail.com hachuan@vnu.edu.vn	

Vietnam composting of livestock manure and biogas power plant generation Capacity Building program

Session 1. Biogas Plant Policy in Korea

No	Name	Gender	Affiliation		Position	e-mail	Gift/Fee/N/A	Signature
			Organization	Category				
	Example	Male/Female		a) Government agencies b) Private sector c) Non-governmental d) Research institute, University, Laboratory e) Local government		abc@gmail.com		
1	Hương Thị Yến	Nữ (F)	Bukang	b	manager	yenhuang9993@gmail.com		
2	Nguyễn Thị Hằng	Nữ	BKT	b	manager	nguyenthih88.dhuh@gmail.com		
3	Nguyễn Thị Bích Ngọc	F	BKT	b	manager	nbk@bkt21.com		
4	Nguyễn Thanh Trúc	M	BKT	b	engineer	trungnt@gmail.com		
5	Trần Thị Hằng	M	ODIN	b	CEO	stew1@bkt21.com		
6	Trần Thị Hằng	M	BKT	b	CEO	ky1@bkt21.com		
7	Lee Jongsun	F	Ecosian	b	Researcher			
8	Jeong Hee Jeong	F	Ecosian	b	Researcher			
9	Jeehan Kim	M	Ecosian	b	Senior Researcher			
10	Haeyun Yoon	M	Ecosian	b	Director			

Annex B: Feedback Form (English)

Vietnam composting of livestock manure and biogas power plant generation Capacity Building program

Thank you for participating in Vietnam composting of livestock manure and biogas power plant generation Capacity Building program. This survey is designated by Ecosian for CTCN TA Capacity Building Program Evaluation. For your guidance, please refer to *the description in italic font* and leave all the other words and format as they were given.

General Information

Title of training	「Vietnam composting of livestock manure and biogas power plant generation」 Capacity Building program
Start date	
End date	
Location (Address)	
Location (City)	Hanoi
Location (Country)	Vietnam
Affiliation	
Type of Affiliation	<p>Function:</p> <p><input type="checkbox"/> <u>Government agencies</u></p> <p><input type="checkbox"/> <u>Private sector</u></p> <p><input type="checkbox"/> <u>Non-governmental</u></p> <p><input type="checkbox"/> <u>Research institute, University, Laboratory</u></p> <p><input type="checkbox"/> <u>Local government</u></p> <p><input type="checkbox"/> <u>Others</u> (<i>if checked 'Others', please provide us with brief introduction of your organization.</i>)</p> <p>▶</p>
	<p>Area of focus / expertise:</p> <p><input type="checkbox"/> <u>Policy</u></p> <p><input type="checkbox"/> <u>Technology</u></p> <p><input type="checkbox"/> <u>Finance</u></p> <p><input type="checkbox"/> <u>Network/Engagement</u></p> <p><input type="checkbox"/> <u>Others</u> (<i>If checked 'Others', please provide us with a brief description of the technology or policy area that your organization focuses on.</i>)</p> <p>▶</p>

Survey

Please assess the (I) Understanding, (II) Capacity Building and (III) Overall Satisfaction on a scale from 1 to 5, using mark the “V”.

Biogas plant policy in Korea					
- Biogas plant policy in Korea (ECOSIAN)					
Questions	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
I. Understanding					
I-1. The training contributed to my understanding of the biogas plant.					
I-2. The training contributed to my understanding of the necessity of similar policy /technology.					
II. Capacity Building					
II-1. The training received is useful in relation to my work and capacity building.					
II-2. The training enabled me to share professional experiences with colleagues.					
III. Overall Satisfaction					
III-1. The format of the training was well suited to the learning objectives.					
III-2. The length of the training was adequate for the objectives and content.					
III-3. The training allowed adequate time for questions and discussions.					
III-4. Overall, I am satisfied with the training provided.					

Please assess the (IV) Knowledge on a scale from 1 to 4, using mark the “V”.

IV. Knowledge			
IV -1. Please indicate your previous level of knowledge on the biogas plant policy addressed in the training.			
No prior understanding (1)	Some prior understanding (2)	Good prior understanding (3)	Very good prior understanding (4)
IV -2. Please indicate your level of knowledge increase on the biogas plant policy addressed in the training.			
Not increased (1)	Moderately increased (2)	Somewhat increased (3)	Significantly increased (4)

Annex C: Feedback Form (Vietnamese)

Ủ phân gia súc và phát điện khí sinh học tại Việt Nam

Chương trình nâng cao năng lực

Cảm ơn Anh (chị) đã tham dự Hội thảo “Xây dựng Năng lực tại Việt Nam - Ủ phân gia súc và phát điện từ nhà máy điện khí sinh học.” Qua khảo sát này, Ecosian thu thập thông tin để Đánh giá Chương trình Nâng cao Năng lực CTCN HTKT. Chi tiết hướng dẫn vui lòng tham khảo *phần mô tả bằng phong chữ in nghiêng*.

Thông tin chung

Tiêu đề	「Ủ phân gia súc và phát điện khí sinh học tại Việt Nam」Chương trình nâng cao năng lực
Ngày bắt đầu	
Ngày kết thúc	
Địa điểm	
Thành phố	Hanoi
Quốc gia	Vietnam
Liên kết	
Loại hình liên kết	Chức vụ: <input type="checkbox"/> Cơ quan nhà nước <input type="checkbox"/> Công ty tư nhân <input type="checkbox"/> Phi chính phủ <input type="checkbox"/> Viện nghiên cứu, trường đại học, phòng thí nghiệm <input type="checkbox"/> Chính quyền địa phương <input type="checkbox"/> Khác (Nếu chọn “Khác”, vui lòng cung cấp thêm thông tin ngắn gọn về Tổ chức.) ▶
	Lĩnh vực tập trung / chuyên môn: <input type="checkbox"/> Chính sách <input type="checkbox"/> Công nghệ <input type="checkbox"/> Tài chính <input type="checkbox"/> Mạng lưới/kết nối <input type="checkbox"/> Khác (Nếu chọn 'Khác', vui lòng cung cấp thông tin ngắn gọn về công nghệ hoặc chính sách đang hướng tới.) ▶

Khảo sát

Vui lòng đánh giá (I) Mức độ hiểu biết, (II) Xây dựng năng lực và (III) Mức độ hài lòng với thang đánh giá từ 1 đến 5, sử dụng dấu “V”.

Chính sách về khí sinh học ở Hàn Quốc

- Chính sách về khí sinh học ở Hàn Quốc (ECOSIAN)

Câu hỏi	Hoàn toàn không đồng ý (1)	Không đồng ý (2)	Trung lập (3)	Đồng ý (4)	Hoàn toàn đồng ý (5)
I. Mức độ hiểu biết					
I-1. Hội thảo giúp tôi hiểu hơn về công trình khí sinh học.					
I-2. Hội thảo giúp tôi hiểu được sự cần thiết của chính sách/công nghệ tương tự.					
II. Xây dựng năng lực					
II-1. Hội thảo rất hữu ích và liên quan đến công việc và khả năng nâng cao năng lực của tôi.					
II-2. Hội thảo giúp tôi chia sẻ kinh nghiệm nghề nghiệp với các đồng nghiệp.					
III. Mức độ hài lòng					
III-1. Hình thức hội thảo phù hợp với tôi.					
III-2. Thời lượng hội thảo phù hợp với mục tiêu và nội dung.					
III-3. Hội thảo với khung thời gian hợp lý cho phần câu hỏi và thảo luận.					
III-4. Nhìn chung, tôi hài lòng với hội thảo này.					

Vui lòng đánh giá (IV) Kiến thức theo thang từ 1 đến 4, sử dụng dấu “V”.

IV. Kiến thức

IV -1. Vui lòng cho biết mức độ hiểu biết trước đây của Anh (chị) về chính sách khí sinh học được đề cập trong hội thảo.

Không có hiểu biết trước đây (1)	Hiểu biết một chút (2)	Hiểu biết tốt (3)	Hiểu biết rất rõ (4)

IV -2. Vui lòng cho biết mức độ nâng cao kiến thức của Anh (chị) về chính sách khí sinh học được đề cập trong khóa đào tạo.

Không cải thiện (1)	Cải thiện chút ít (2)	Cải thiện tương đối (3)	Cải thiện hoàn toàn (4)

Annex D: LOI (English)

Dear Ecosian & BKT & Department of Livestock Production,

On behalf of [Thai Nguyen Animal Husbandry, Veterinary and Fisheries Sub-Department], we are pleased to announce our intention to support the pilot project resulting from "The pre-feasibility study for the Organic fertilizer and Anaerobic digestion to produce biofuels technology for Vietnamese agricultural sector," which is supported by the Ministry of Science and ICT Korea (MSIT) and the Korea Research Foundation (NRF) and supervised by the National Institute of Green Technology Korea (NIGT).

As a local government, we recognize the potential benefits of biogas plants in our region, particularly in addressing our waste management challenges and providing a reliable source of energy. We believe that this project could help us achieve these goals and benefit our local communities. Therefore, we would like to express our sincere in collaborating with Ecosian & BKT Korea in Vietnam, Department of Livestock Production and [Trong Khoi Company Limited] to install a biogas plant project in our province. We are fully committed to providing any necessary support and assistance to ensure the success of this project.

We would like to thank the Korean Government and the Department of Livestock for considering the role of local authorities in the project. We appreciate the opportunity to work with Ecosian and BKT and hope that this partnership will bring good results for the locality.

Sincerely,



KT. CHI CỤC TRƯỞNG
PHÓ CHI CỤC TRƯỞNG
Đồ Đình Trung

[Thai Nguyen Animal Husbandry, Veterinary and Fisheries Sub-Department]

[Local Government Name]

Annex E: LOI (Vietnam)

Kính gửi Ecosian, BKT và Cục Chăn nuôi

Chi cục Chăn nuôi, thú y và Thủy sản tỉnh Thái Nguyên thông báo bày tỏ quan tâm quyết định hỗ trợ dự án thí điểm "Nghiên cứu tiền khả thi Công nghệ phân bón hữu cơ và phân hủy kỵ khí để sản xuất nhiên liệu sinh học cho ngành nông nghiệp Việt Nam," được hỗ trợ bởi Bộ Khoa học và Công nghệ Thông Tin Hàn Quốc (MSIT) và Quỹ Nghiên cứu Hàn Quốc (NRF) và được giám sát bởi Viện Công nghệ Xanh Quốc gia Hàn Quốc (NIGT) thông qua Cục Chăn nuôi.

Chúng tôi nhận thấy tiềm năng của các công trình khí sinh học ở địa phương, đặc biệt là trong việc giải quyết các thách thức về quản lý chất thải và cung cấp nguồn năng lượng sạch. Chúng tôi tin rằng dự án này có thể giúp địa phương đạt được những mục tiêu cũng như lợi ích cộng đồng.

Vì vậy, chúng tôi gợi ý hợp tác với Ecosian, BKT Hàn Quốc tại Việt Nam, Cục Chăn nuôi để khảo sát tiền khả thi trước khi lắp đặt một dự án công trình khí sinh học tại trang trại Công Ty TNHH Một Thành Viên Trọng Khôi. Chúng tôi cam kết sẽ hợp tác tối đa để mang lại sự thành công của dự án.

Chúng tôi xin trân trọng cảm ơn quý Ecosian, BKT Hàn Quốc tại Việt Nam, Cục Chăn nuôi, chúng tôi đánh giá cao cơ hội hợp tác này và tin rằng quan hệ hợp tác này sẽ mang đến kết quả là dự án được ký kết chính thức, triển khai và sẽ là một công trình khí sinh học tốt cho địa phương./.

Kính thư.

Chi cục Chăn nuôi, thú y và Thủy sản tỉnh Thái Nguyên




KT. CHI CỤC TRƯỞNG
PHÓ CHI CỤC TRƯỞNG
Đỗ Đình Trung