

e-ASIA Joint Research Program Final Report

1. Project title : Feasibility Study on Social Implementation of Bioenergy in East Asia

2. Joint Research period : April 1, 2017 ~ March 31, 2020

3. Research Team :

■ **Japan team** (up to 6 people including the Principal Investigator)

Funding period: April 1, 2017 ~ March 31, 2020

Total Funded Amount (in Local Currency):

	Name	Position	Affiliation	Role in the project
PI	Katsuta Masafumi	Professor	Waseda University	General leader WP1 leader
Co-PI	Hiratsuka Motoshi	Associate professor	Waseda University	WP2 leader
Co-PI	Onoda Hiroshi	Professor	Waseda University	WP3 leader
Co-PI	Nishijima Akio	Adjunct Researcher	The Engineering Academy of Japan	WP4 leader WP1 member
Collaborator	Nagai Yuji	Associate professor	Waseda University	WP1 member
Collaborator	Andante Hadi Pandyaswargo	Assistant Professor	Waseda University	WP3 member
Total number of participants including students: 32				

■ **Thailand team** (up to 6 people including the Principal Investigator)

Funding period: Month, Day, Year - Month, Day, Year

Total Funded Amount (in Local Currency): non

	Name	Position	Affiliation	Role in the project
PI	Paritud Bhandhub anyong	Executive Director,	Panyapiwat Institute of Management	General leader WP1member
Co-PI	Nuwong CHOLLAC OOP	Head of Renewable Energy Laboratory	National Metal and Materials Technology Center	WP1member
Collaborator	MUNGKALASIRI Jitti	Head of Life Cycle Assessment Laboratory	National Metal and Materials Technology Center	WP1member
Collaborator	SRINOPHAKUN Penjit	Assoc. Prof.	Kasetsart University Chemical Engineering Department	WP1member
Collaborator	CHAORAKAM Isara	Manager of National Agricultural Machinery Center	Kasetsart Kamphaengsae n campus	WP1member
Collaborator	BOONKUM Pornpimon	Researcher	National Metal and Materials Technology Center	WP3member
Total number of participants including students: 14				

■ **Indonesia team** (up to 6 people including the Principal Investigator)

Funding period: Month, Day, Year - Month, Day, Year

Total Funded Amount (in Local Currency): non

	Name	Position	Affiliation	Role in the
--	------	----------	-------------	-------------

				project
PI	Anugerah Widiyanto	Director	Agency for the Assessment and Application of Technology	General leader WP1member
Collaborator	Uswatun Hasanah	Assistant Professor	Faculty of Economics and Business, Universitas Indonesia	WP1member
Total number of participants including students: 11				

■ **Vietnam team** (up to 6 people including the Principal Investigator)

Funding period: Month, Day, Year - Month, Day, Year

Total Funded Amount (in Local Currency): non

	Name	Position	Affiliation	Role in the project
PI	Le Anh Tuan	Professor	Hanoi University of Science and Technology	General leader WP1member
Collaborator	Tran Thi Thu Hong	Associate Prof.	Hanoi University of Science and Technology	WP1member
Collaborator	NGUYEN Duc Khanh	School of Transportation Engineering	Hanoi University of Science and Technology	WP3member
Collaborator	Nguyen Kim Thoa	Head of Biomaterial Technology Lab.	Institute of Biotechnology, Vietnam Academy of Science and Technology	WP1member
Total number of participants including students: 10				

■ **Myanmar team** (up to 6 people including the Principal Investigator)

Funding period: Month, Day, Year - Month, Day, Year

Total Funded Amount (in Local Currency): non

	Name	Position	Affiliation	Role in the project
PI	Ei Ei Htwe	Professor	Mechanical Engineering Department, Mandalay Technological University	General leader WP1,3 member
Collaborator	Myint Wai	Patron	Wa Minn Group of Companies	WP1 member
Total number of participants including students: 2				

■ **Lao team** (up to 6 people including the Principal Investigator)

Funding period: Month, Day, Year - Month, Day, Year

Total Funded Amount (in Local Currency): non

	Name	Position	Affiliation	Role in the project
PI	Bounmy Keohavong	Director	Office of Academic Research, Souphavong University	General leader WP1member-
Collaborator	XAYYAVONG Syvang	Researcher	Institute for Energy and Mines, Ministry of Mines	WP1member-
Total number of participants including students: 2				

4. Summary of the joint research

This extensive joint research project participated by six countries (Japan, Thailand, Vietnam, Indonesia, Lao and Myanmar) will conduct surveys and studies on practical application of biomass energy which will contribute to the building low-carbon society.

Specifically, the project will aim to construct a wide-area network with ASEAN countries that are highly interested in biomass energy, and carry out collaborative research toward the social implementation of biomass energy. (needs of each country, sustainable starting materials, effective conversion technologies, LCA, etc.)

As for the division of roles, the ASEAN countries will play a central role in understanding the amount and species of biomass that can be produced and the Japanese side will also participate to

create utilization scenarios by country, soil and climate characteristics. In addition, Japan, Thailand, Indonesia, Vietnam, etc. will take the lead in technology and compile a technical scenarios appropriate for LCA. By consolidating these results, We aim to build a biomass energy introduction strategy that takes into account the differences in social systems by country and region.

Through the above approach, participated countries will share its biomass energy strategy in East Asia and promote Japan's science and technology diplomacy in the field of environmental energy. In addition, we aim to promote, collaborate and strengthen human resources exchange, especially with younger generation to nurture new talents and construct sustainable human resource network.

5. Outputs and Anticipated Outcomes of Joint Research

5-1 Scientific achievements and implemented activities of the joint research

Discussions on the realization of a biomass society in East Asia need to be based on reliable data. In this international collaborative research, (1) data that contributes to grasping the production amount of starting materials, (2) data on the status of biomass technology development and its technological maturity, and (3) survey data on social needs surrounding biomass such as company trends and social conditions are collected. .. And we reported these as academic achievements. Furthermore, we worked on international discussions based on these, strategy making, and policy making. We also worked on the development of international joint research themes.

5-2 Synergistic effects of the international joint research

We held two international conferences to promote international collaborative research. The following activities were carried out by taking advantage of the advantages of international collaboration. A: An international strategy that eliminates the ambiguity found in the past by collecting basic data on starting materials and technological maturity on the same map, and based on quantitative data while considering geographical restrictions. Through such work, GIS system was built to contribute an international strategy. B: Through joint research in the non-electrified areas, we were able to understand detailed issues in each country that could not be captured by macro statistics or demand surveys in large cities. C: Through the two international conferences, the international agreements of 6 countries were adopted.

5-3 Broader impacts including contribution to society

The East Asian biomass strategy is summarized based on priority issues and regional characteristics in the biomass field. The use of high-value-added fuels and materials that require international support and the small-scale distributed use that requires local adaptation were clearly considered, and the balance between large-scale use and appropriate-scale use was clarified. These will be put together in the form of policy recommendations and will be utilized in various places in the future. Moreover, as a concrete project implementation, as a concrete example of the biomass utilization method aiming at SDGs, we worked on creating concrete cases of BOP countermeasures and were evaluated as a useful model in Indonesia.

5-4 Development and sustainability of the cooperation

The result of aggregation of basic data obtained in this joint research is not a complete form as a database. Since this database changes rapidly in the social situation surrounding biomass, it is necessary to update the database in response to such changes in the social situation. Furthermore, the survey of basic data is important for young researchers to further develop their research. The basic data survey itself cannot be a research paper, but I would like to recommend that universities and research institutes use such steady research as the research achievements of young researchers. International collaborative research is indispensable for responding to international changes in social conditions, and we will continue to maintain the cooperative relationship obtained through this project. We would like to continue the system that allows young researchers to participate in this exchange, and use it as a model for sustainable international research exchange.

6. Future Goals and Plan of Activities after the project period

At international conferences, the necessity of continuous networks and the need for human resource development were confirmed, and we promised that young researchers will contribute to the continuous maintenance of the information sharing system constructed through this project. Furthermore, in order to maintain these activities continuously, we established the “Waseda University East Asia Biomass Research Center” which has a formal positioning of the university, to ensure the long-term research exchanges. Furthermore, continuous research funding has been realized. As a policy recommendation, we have advocated "establishment of the Southeast Asian Biomass Society" and will continue to make progressive efforts.

7. Scientific Achievements and Implemented Activities (Publication, Research Exchange, Workshop, etc.)

**For this item, please fill in the attached Excel file.*

8. Recommendations and Comments to the Program

The three-year research study was very meaningful from the perspective of building an international joint system and creating new personnel exchanges. We believe that we can maintain good relations with each country in the future. The staff of the secretariat and Professor Kokubun gave us very qualified advice, which was very helpful. We thank you for understanding the situation on the project side and guiding the results.

Unfortunately, this project was funded only by the Japanese side. We would like to ask for your consideration in adjusting the research funding of the partner country.

9. Others (agenda of workshop, photos of research teams, meetings, and etc.)

a) Kickoff International Conference

In October of the first year, as a kick-off project, an international meeting with six countries participating was held in Thailand to identify common issues. Participating countries were 19 people from Japan, 25 people from Thailand, and 6 people from 4 countries. This meeting was jointly worked by Japan and Thailand.

Since this meeting is the first year, each country decided to share the current efforts. Participating countries' awareness of issues and biomass policies were provided, and researchers' efforts and interests were shared.



Fig.1 Group photo of an international conference in Thailand

b) Final International Conference

The third year of the meeting was held in Indonesia in September with 6 countries participating. The meeting was an opportunity for Indonesia and Japan, the host countries, to work together to begin research exchanges with the University of Indonesia, which was the venue.

Regarding the format of the meeting, in addition to updating the current efforts of each country, the status of the collection of basic data, the draft report for the final proposal, and the exchange of opinions were carried out, and the international agreements of the six countries were adopted.



Fig.2 Group photo of an international conference in Indonesia

c) Adoption of international agreement

Regarding the agreement, based on the two international conferences, the future policy was examined and the agreement was confirmed while confirming the situation and research progress of each country concerning biomass. The final agreement is as follows.

- ✓ For the stable use of biomass, it is necessary to consider not only the implementation of biomass technology development but also the characteristics of the starting material such as crops as biological resources.
- ✓ Biomass is expected as a new alternative energy resource in all countries. Many biomass power plants have already been installed. In the future, when installing a biomass power generation and heat utilization plant, it should be installed in consideration of local needs and resource amounts.
- ✓ The following four are important for the future of biomass utilization: reconstruction should be done in consideration of the situation of agriculture and forestry in each country, aviation fuel with attention to international regulations, and recent plastics due to problems, the development of alternative materials is unavoidable, and the technological development of bio-based materials is to rebuild existing technologies.
- ✓ In order to respond to biomass issues, it is necessary to fully consider the balance between biomass production and people's lives in rural areas (including people in non-electrified areas), resilience of energy use during disasters, and industrial development.

d) Construction of GIS system for organizing basic data

Above all, biomass use is the key to achieving the Sustainable Development Goals (SDGs) and requires further collaboration on scientific outcomes sharing, field-based experience and joint implementation towards 2030. It was a common understanding that.

One of the obstacles when discussing biomass is that the events of various phases are discussed as if they were general theory. Discussions that do not take into account the circumstances of each country and the characteristics of resources have often been an obstacle to discussions in this research. Therefore, we recognized that it is important to promote international joint research that emphasizes the basic data obtained in this study.

In this research, the basic data such as (1) amount of starting material in the region and (2) demonstration of biomass technology and location of facilities were overlaid and aggregated on the same map, and a shared system was constructed on the Web. By using this system, it is possible to eliminate the ambiguity of biomass discussions that have been seen in the past and to contribute to the construction of international strategies while considering geographical restrictions based on quantitative data.

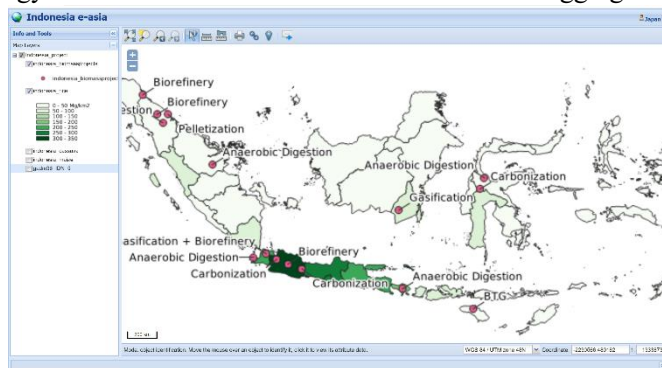


Fig.3 Web GIS system

Lists of Achievements and Implemented Activities

1. Original Publication of Articles etc.

1. 1 Original Publications (Articles co-authored among Research Teams)

All Authors' Names, Title, Journal Name, Volume, Edition, Page, Year of Publication	DOI Code	Publication Status	Remarks (e.g. publication in top level journals etc.)
Motoshi Hiratsuka, Hayato Tsuzuki, Kei Suzuki, Takashi Nanaumi, Tomoko Furuta, Kouhei Niitsuma, Chanhsamone Phongoudome & Masahiro Amano, Living biomass of fallow areas under a REDD+ project in mountainous terrain of Northern Laos, Journal of Forest Research, pages 56-63, 2017	10.1080/13416979.2017.1393605	published	
Akio Nishijima, Hideo Samura, Tomoko Saiki, Norio Ohto and Paritud Bhandhubanyong, Social implementation of biomass energy for SDGs in East Asia, International Scientific Journal of Engineering and Technology, Vol. .2, No. 1., 51, 2018	Indexed in the Thai-Journal Citation Index (TCI 2)	published	
Motoshi Hiratsuka, Eiichiro Nakama, Trisnu Satriadi, Hamdani Fauzi, Mahrus Aryadi, Yasushi Morikawa. 2019. An Approach to Achieve Sustainable Development Goals Through Participatory Land and Forest Conservation: A Case Study in South KALIMANTAN Province, Indonesia. Journal of Sustainable Forestry. in press.	10.1080/10549811.2019.1598440	published	
Andante Hadi Pandyaswargo, Mengyi Ruan, Eiei Htwe, Motoshi Hiratsuka, Alan Dwi Wibowo, Yuji Nagai, Hiroshi Onoda, Estimating the current energy demand and growth in off-grid villages: Case studies from Myanmar, Indonesia, and Laos, Energy for Sustainable Development. Under review			under review
4 Total			

1. 2 Original Publications (Articles by Single Team only)

All Authors' Names, Title, Journal Name, Volume, Edition, Page, Year of Publication	DOI Code	Publication Status	Remarks (e.g. publication in top level journals etc.)	Country name of the team
Kenta Omura, Andante Hadi Pandyaswargo, Hiroshi Onoda, LCCO2 of coal co-firing with imported torrefied woody biomass in Japan, E3S Web of Conferences, 74, 1-8, 2018	doi: 10.1051/e3sconf/20187403001	published		Scopus indexed 2018.12.12 published
Akio Nishijima, Hideo Samura, Tomoko Saiki, and Norio Ohto, ASEAN-Japan collaboration on biomass energy towards low carbon society and SDGs, Proceedings of Grand Renewable Energy 2018 International Conference, June 17, 2018	doi.org/10.24752/gre.1.0_14	published		2018.6.17 conference
Eiichiro Nakama, Kazuo Tanaka, Mahrus Aryadi, Hamdani Fauzi, Trisnu Satriadi, Motoshi Hiratsuka, Seiichi Ohta and Yasusih Morikawa. Reforestation of a Degraded National Forest in Indonesia by Planting Rubber Trees with Local Participation : Success Factors in Tanah Laut District Case, South Kalimantan Province. Forest economy 72(1), 1-17, 2019.	doi.org/10.19013/rinrin.72.1_1	published		
HU, H., ZHAO, R., OMURA, K., & ONODA, H., Development of a Municipal Waste Management System from Environmental and Economic Evaluation Perspectives: A Best Available System Methodology, Technologies and Eco-innovation towards Sustainability II, 81-97, 2019.	doi: 10.1007/978-981-13-1196-3	published		
Pandyaswargo, A. H., Jagath Dickella Gamaralalage, P., Liu, C., Knaus, M., Onoda, H., Mahichi, F., & Guo, Y. (2019). Challenges and an Implementation Framework for Sustainable Municipal Organic Waste Management Using Biogas Technology in Emerging Asian Countries. Sustainability, 11(22), 6331.	doi.org/10.3390/su11226331	published		Scopus indexed

Pandyaswargo, A. H., Pang, D., Ihara, I., & Onoda, H. (2020). Japan-Supported Biomass Energy Projects Technology Readiness and Distribution in the Emerging Southeast Asian Countries: Exercising the J-TRA methodology and GIS. International Journal of Environmental Science and Development	doi:10.18178/ijesd.2020.11.1.1217	published		Scopus indexed
Motoshi Hiratsuka, Characteristics of secondary forest dominated by Quercus serrata and its relation to human activities in Sayama hills, Human Science Research, 32;2, 263—271.		published		
Motoshi Hiratsuka, Kazuya Hatakeyamaa, Toshihiro Ohkuboa and Daigo Takeuchi, Dynamics of secondary forest and its perspective under the Satoyama system in Saitama prefecture, Japan. 2020, Pages 51–57	doi:10.1080/13416979.2020.1719573	in press		
8		Total		

Lists of Achievements and Implemented Activities

2. presentations at Academic Conferences etc. (Seminars, Workshops, Symposia)

2. 1 Conference Presentations (Joint Presentations among Research Teams)

Date	Type of Presentation	Speaker, "Title", Conference Name, Location, etc.
February 23–27,2017	Oral Presentation	Syvang Xayyavong, Prof. Dr. Yoshihito Shirai. "FEASIBILITY STUDY OF 200,000 LITERS PER DAY ETHANOL PRODUCTION FROM CASSAVA CHIPS". CONFERENCE OF RENEWABLE ENERGY RESEARCHERS HUMAN RESOURCES DEVELOPMENT PROGRAM
June 8–10, 2018	Poster Session	Motoshi Hiratsuka, Chaloun Bounithiphonh, Phonevilay Sichanthongthip, Banthasack Vongphuthone, Chanh Samone Phongoudome and Masahiro Amano. Performance improvement through REDD+ activities in northern Lao PDR. The 28th Annual Meeting of the Japan Society of Tropical Ecology. Shizuoka University. 8th–10th June 2018.
December 9–10, 2019	Guest/Invited Speaker	Eiei Htwe and Andante Hadi Pandyaswargo. "Biomass Utilization in Non- electrified Area". Asean Emerging Researchers Conference 2019, Sunway University Malaysia.
September 13–14, 2019	Poster Session	Mengyi Ruan, Pandyaswargo Andante Hadi, Hiroshi Onoda, Htwe Ei Ei. "Energy Demand Estimation of an Unelectrified Village in Myanmar". Annual Conference: the Society of Environmental Science, 2019, Nagoya University
4	Total	

2. 2 Conference Presentations (by Single Team)

Date	Type of Presentation	Speaker, "Title", Conference Name, Location etc.	Country name of the team
March 23, 2017	Oral Presentation	SYVANG XAYYAVONG, PROF. DR. YOSHIHITO SHIRAI. FEASIBILITY STUDY OF 200,000 LITERS PER DAY. ETHANOL PRODUCTION FROM CASSAVA CHIPS. CONFERENCE ON PROMOTION OF GREEN DEVELOPMENT AND RENEWABLE ENERGY	Lao
August 2, 2017	Oral Presentation	Yuji NAGAI, Hisanori OKADA, Kenji HORIGUCHI, Nobuo TANIGUCHI, Sawako SHIGETO, Masayuki HORIO, Takayuki TAKARADA, Wataru ICHIMIYA, A Study on the facilitation of local deployment of renewable energy usage and energy saving –An analysis on the current situations of local governments, The Japan Institute of Energy 26th, 2017/8/2	Japan
August 3, 2017	Oral Presentation	Hisanori OKADA, Yuji NAGAI, Nobuo TANIGUCHI, Akihiro, SHIMA, Norihiro SUGANO (ENEBEN), A Study on the problem of Regional Financial Institute for renewable energy usage – An analysis on the current situations of Regional Financial Institute, The Japan Institute of Energy 26th, 2017/8/2	Japan

September 6 – 8, 2017	Poster Session	Ruixi ZHAO, Hao HU, Zeshi WANG, Ryota TSUBOUCHI, Kenta OMURA, Motoyuki OKADA and Hiroshi ONODA, "Economic and environmental assessment of waste biomass recycling system in Aizuwakamatsu city", Japan Society of Material Cycles and Waste Management, Proceedings of the Japan Society for Waste and Resources Recycling 28th, 2017/9/6–2017/9/8	Japan
November 29–December 1, 2017	Poster Session	Hao HU, Ruixi ZHAO, Kenta OMURA, Hiroshi ONODA, "Development of a municipal waste management system from environmental and economic evaluation perspectives: A best available system methodology", EcoDesign 2017, @Taiwan, 2017/11/29–2017/12/1	Japan
March 2018	Poster Session	Daigo Takeuchi and Motoshi Hiratsuka. Relationship between water level and wetland vegetation in valley environmental condition (Yato), 64th Annual Meeting of the Ecological Society of Japan, Sapporo, Japan, 2017.	Japan
June 20, 2018	Oral Presentation	Akio Nishijima, Hideo Samura, Tomoko Saiki and Norio Ohto, ASEAN–Japan collaboration on biomass energy towards low carbon society and SDGs, Grand Renewable Energy/ 2018/International Conference, Pacifico Yokohama, June 20, 2018,	Japan
July 2018	Oral Presentation	Omura Kenta, Ogawa Gaiya, Miyagi Takuya, Hayase Kazuo, Onoda Hiroshi, LCCO2 of Coal Co-firing process with Torrefied Woody biomass, 28th Environmental Engineering Symposium, Tokyo, July 2018	Japan
July 11–12, 2018	Oral Presentation	Itsuki Miyahara, Omura Kenta, Onoda Hiroshi, Actual measurement evaluation of small and medium scale woody biomass gasification power generation system, The 28th Symposium on the Japan Society of Mechanical Engineers, Tokyo, Japan.	Japan
July 11–12, 2018	Oral Presentation	Ruixi ZHAO, Zeshi WANG, Hao HU, Hiroshi ONODA, "Current Situation Analysis of Waste Management in China and Recommendation to Introduce Methane Fermentation Technology", The 28th Symposium on the Japan Society of Mechanical Engineers, Tokyo, Japan.	Japan
August 8, 2018	Oral Presentation	Yuji NAGAI, Hisanori OKADA, Yasushi MORIKAWA, Toshihiro OHOKUBO, Yu SATO, Tomoharu SATO, Takeshi FUTABA, Juro WATANABE, Demand amount and suppleable amount of forest biomass to energy use in short harvesting cycle in Oguni Town, Yamagata pref., The Japan Institute of Energy 27th, 2018/8/8	Japan
October 24–25, 2018	Oral Presentation	Kenta Omura, Andante Hadi Pandiyaswargo, Hiroshi Onoda, LCCO2 of coal co-firing with imported torrefied woody biomass in Japan, International Conference Series on Life Cycle Assessment: Life Cycle Assessment as A Metric to Achieve Sustainable Development Goals (ICSoLCA 2018), Jakarta, Indonesia	Japan
December 5, 2018	Oral Presentation	Ihara, I., Pandiyaswargo, A.H., Onoda, H., "Development and the Effectiveness of the J-TRA: A Methodology to Assess Energy Technology R&D Programs in Japan", Ecodesign Product and Service Symposium 2018, Tokyo, Japan.	Japan
March 5–7, 2019	Oral Presentation	Da Pang, Andante Hadi Pandiyaswargo, Hiroshi Onoda, Issui Ihara, Application of J-TRA (Japanese version of Technology Readiness Assessment) to biomass utilization projects: with focus Biomass Energy Conversion Technologies in Southeast Asia, The 14th Japan LCA Conference Presentation, Fukuoka, Japan	Japan
Feb 27 – Mar 1, 2019	Guest/Invited Speaker	Andante Hadi Pandiyaswargo, Guideline Development on Anaerobic Digestion for MSWM, The 3R International Scientific Conference on Material Cycles and Waste Management, Bangkok, Thailand	Japan
March 20 – 23, 2019	Oral Presentation	Motoshi Hiratsuka and Daigo Takeuchi. Analysis of the sustainability in secondary forest management in Kamitome-area, Miyoshi-city, Saitama Prefecture. 128th Annual Meeting of the Japanese Forest Society, Niigata, Japan.	Japan
May 9, 2019	Guest/Invited Speaker	Andante Hadi Pandiyaswargo, Off-grid energy use and biomass energy utilization in emerging southeast Asia, RCAPS Seminar, Oita, Japan	Japan
May 21–23, 2019	Guest/Invited Speaker	Andante Hadi Pandiyaswargo, Biogas guideline for decision makers and practitioners, Technology Solutions for Holistic Waste Management – A Global Dialogue with the Private Sector, Osaka, May 2019	Japan
June 25–28, 2019	Oral Presentation	Ihara, I., Pandiyaswargo, A. H., Pang, D., & Onoda, H. Technology Readiness Assessment of Biomass Energy Projects using J-TRA method: Application on Southeast Asian Countries. International Workshop on Environmental Engineering 2019. Okinawa, Japan: The Japan Society of Mechanical Engineers.	Japan

November 9–11, 2019.	Oral Presentation	Pandyaswargo, A. H., Pang, D., Ihara, I., & Onoda, H. Japan–Supported Biomass Energy Projects Technology Readiness and Distribution in the Emerging Southeast Asian Countries: Exercising the J–TRA methodology and GIS. The 4th Asia Conference on Environment and Sustainable Development, Yokohama, Japan.	Japan
November 24– 27,2019	Oral Presentation	Yoshidome, D., Kikuchi, R., Pandyaswargo, A. H., & Onoda, H. (2019). Evaluation and Improvement Proposals for a Business Facility Solar and Ground–Heat Hybrid Heat Supply System. Ecodesign 2019: The 11th International Symposium on Environmentally Conscious Design and Inverse Manufacturing, Yokohama, Japan.	Japan
November 24– 27,2019	Oral Presentation	Ihara, I., Pandyaswargo, A. H., & Onoda, H. The Readiness Levels of Japan Supported Biomass Energy Conversion Technology Development Projects in Emerging Southeast Asia: Verification of the J–TRA results. Ecodesign 2019: The 11th International Symposium on Environmentally Conscious Design and Inverse Manufacturing, Yokohama, Japan.	Japan
17	Total		

Lists of Achievements and Implemented Activities

3. Workshops, Seminars, Symposia and Other Events (Organized by the Project)

Event duration	Name of Organizer	Title of the Event	Location (Country, City, Venue)	Number of Participants (Including Team Members)	Overview
Aug. 3, 2017	Hiroshi Onoda	Japan –Myanmar Workshop	Japan, Tokyo, Waseda University	25	Discussion on bilateral cooperation
Aug. 25, 2017	Masabumi Katsuta	Japan –Thailand Worksop	Thailand, Bnagkok, NSTDA	20	Discussion
Sep. 25, 2017	Akio Nishijima	Japan –Indonesia Worksop	Indonesia, Jakarta, BPPT	20	Discussion on bilateral cooperation
Sep. 27, 2017	Akio Nishijima	Japan –Lao Worksop	Lao, Luang Phabang, Souphanouvong University	10	Discussion on bilateral cooperation
Sep. 29, 2017	Akio Nishijima	Japan –Vietnam e-ASIA Worksop	Vietnam, Hanoi, Hust	15	Workshop
Oct. 20–31, 2017	Masafumi Katsuta, Dr. Paritud	e-ASIA workshop (6 countries)	Thailand, Bnagkok, NSTDA	35	e-ASIA (6 countries) workshop
Dec. 10, 2018	Akio Nishijima	Japan–Myanmar seminar	Myanmar, Yezin, Yezin Agricultural University	10	Discussion on agriculture and industrial sectors collaboration
Dec. 12, 2018	Akio Nishijima	Japan Myanmar workshop on biomassenergy	Maynmar, Yangon, Yangon Technological University	25	Discussion on bilateral cooperation
Mar. 11, 2019	Akio Nishijima	Japan Thailand e-ASIA workshop	Thailand, Bangkok NSTDA	25	Discussion on bilateral cooperation
Mar.14, 2019	Akio Nishijima	Japan –Lao e-ASIA Worksop	Lao, Vientiane, Ministry of Energy and Mines	25	Discussion on bilateral cooperation
Mar. 15, 2019	Dr. Anugerah	Japan –Indonesia e-ASIA Worksop	Indonesia, Jakarta, BPPT	20	Discussion on bilateral cooperation
Mar. 27, 2019	Andante Hadi Pandyaswargo, Prof. Eiei Htwe	Field work: Questionnaire Survey of Energy use and demand in Off-grid area	Myanmar, Mandalay, Thae Kone Village	105	Questionnaire survey collection
May. 9, 2019	Andante Hadi Pandyaswargo	Seminar: Off-grid energy use and biomass energy utilization in emerging southeast Asia, RCAPS Seminar	Japan, Oita, Ritsumeikan Asia Pacific University	45	Attended by Ritsumeikan Asia Pacific University Lecturers and Students

Aug. 21, 2019	Andante Hadi Pandyaswargo, Mr. Alan Dwi Wibowo	Field work: Questionnaire Survey of Energy use and demand in Off-grid area	Indonesia, South Kalimantan, Karya Jadi Village	58	Questionnaire survey collection
Aug. 22, 2019	Andante Hadi Pandyaswargo, Mr. Alan Dwi Wibowo	Seminar: Japanese version of Technology Readiness Assessment (J-TRA) and Environmental Load Point (ELP): Understanding the Sustainability of Technology Development Projects	Indonesia, Lambung Mangkurat University,	12	Attended by Lambung Mangkurat University Lecturers and Researchers
Aug. 23, 2019	Andante Hadi Pandyaswargo, Mr. Alan Dwi Wibowo	General Lecture / Symposium: Measuring the readiness of Japan-supported biomass energy technology development projects in Southeast Asia: Demonstration of the J-TRA methodology	Indonesia, Lambung Mangkurat University,	205	Attended by Lambung Mangkurat University Lecturers and students
Aug. 25, 2019	Andante Hadi Pandyaswargo	Seminar: Technology Readiness Assessment (TRA) and Environmental Load Point (ELP): Understanding the sustainability of technology development projects, Invited Lecture, Gadjah Mada University (UGM)	Indonesia, Gadjah Mada University	48	Attended by Gadjah Mada University Lecturers and students
Sep. 17, 2019	Masafumi Katsuta	Meeting with Prof. Dr. Erliza Hambali and Yanmar Agricultural Research Institute	Indonesia, Bogor, IPB University	15	Hearing about the biomass situation in Indonesia
Sep. 18, 2019	Masafumi Katsuta, Universities in Indonesia,	e-ASIA workshop (6 countries)	Indonesia, Depok, Universities in Indonesia,	26	e-ASIA workshop (6 countries)
Sep. 19, 2019	Masafumi Katsuta, Universities in Indonesia,	Community-based Forest Products Utilization for SDGs	Indonesia, Depok, Universities in Indonesia,	200	Community-based Symposium
20 Total					

Lists of Achievements and Implemented Activities

4. Record of Research Exchanges

Date of Departure	Date of Return	Last Name & First Name	Country of Affiliation	Affiliation	Position	Exchange Destination (Country, City, Research Organization etc)	Description of Exchange Content/Purpose	Duration of Exchange (autocompleted)
2017/7/2	2017/7/5	Akio Nishijima	Japan	Waseda University, EAJ	Adjunct Researcher, Project General Manager	Thailand, Bangkok NSTDA	Symposium	4
2017/7/31	2017/8/4	Ei Ei Htwe	Myanmar	Mechanical Engineering Dept., Mandalay Technological University	Professor	Japan, Tokyo, Waseda Univ., Tsukuba AIST	Japan-Myanmar Workshop	5
2017/7/31	2017/8/4	Yen Min Htut	Myanmar	Renewable Energy Research Department, Department of Research and Innovation	Assistant Director	Japan, Tokyo, Waseda Univ., Tsukuba AIST	Japan-Myanmar Workshop	5
2017/8/23	2017/8/26	Masafumi Katsuta	Japan	Waseda University	Professor	Thailand, Bangkok NSTDA, TISTR, KU	Discussion on bilateral cooperation	4
2017/8/23	2017/8/26	Hiroshi Onoda	Japan	Waseda University	Professor	Thailand, Bangkok NSTDA, TISTR, KU	Discussion on bilateral cooperation	4
2017/8/23	2017/8/26	Akio Nishijima	Japan	Waseda University	Adjunct Researcher	Thailand, Bangkok NSTDA, TISTR, KU	Discussion on bilateral cooperation	4
2017/9/24	2017/9/30	Akio Nishijima	Japan	Waseda University	Adjunct Researcher	Indonesia, Jakarta BPPT; Lao, Luang Phabang, Vietnam, Hanoi, NUST	Discussion	7
2017/9/24	2017/9/30	Hideo Sasaki	Japan	EAJ	Project Team Member	Indonesia, Jakarta BPPT; Lao, Luang Phabang, Vietnam, Hanoi, NUST	Discussion	7
2017/10/29	2017/10/31	Akio Nishijima	Japan	Waseda University	Adjunct Researcher	Thailand, Bangkok	e-ASIA Workshop (6 countries)	3
2017/10/29	2017/10/31	Hideaki Oogaki	Japan	Kyoto University	Professor	Thailand, Bangkok	e-ASIA Workshop (6 countries)	3
2017/10/29	2017/10/31	Hideo Sasaki	Japan	EAJ	Project Team Member	Thailand, Bangkok	e-ASIA Workshop (6 countries)	3
2017/10/29	2017/10/31	Hiroshi Onoda	Japan	Waseda University	Professor	Thailand, Bangkok	e-ASIA Workshop (6 countries)	3
2017/10/29	2017/10/31	Kohei Suda	Japan	Hunds Electric Power CO., Ltd	CEO	Thailand, Bangkok	e-ASIA Workshop (6 countries)	3
2017/10/29	2017/10/31	Masafumi Katsuta	Japan	Waseda University	Professor	Thailand, Bangkok	e-ASIA Workshop (6 countries)	3
2017/10/29	2017/10/31	Masayuki Sagisaka	Japan	AIST	Honorary Fellow	Thailand, Bangkok	e-ASIA Workshop (6 countries)	3
2017/10/29	2017/10/31	Norio Ohto	Japan	the Takeda Foundation	Senior Managing Director	Thailand, Bangkok	e-ASIA Workshop (6 countries)	3

2017/10/29	2017/10/31	Ruixi Zhao	Japan	Waseda University	PhD. Student	Thailand, Bangkok	e-ASIA Workshop (6 countries)	3
2017/10/29	2017/11/1	Takashi Matsumoto	Japan	YANMAR HOLDINGS CO., LTD.	Engineer	Thailand, Bangkok	e-ASIA Workshop (6 countries)	4
2017/10/29	2017/10/31	Tomoko Saeki	Japan	Tokyo Institute of Technology	Professor Emeritus	Thailand, Bangkok	e-ASIA Workshop (6 countries)	3
2017/10/29	2017/10/31	Yoshio Takatsuka	Japan	Yamato Sanko MFG.Co.,LTD.	Engineering & Energy Adviser	Thailand, Bangkok	e-ASIA Workshop (6 countries)	3
2017/10/29	2017/10/31	Yuji Nagai	Japan	Waseda University	Researcher (Associate Professor)	Thailand, Bangkok	e-ASIA Workshop (6 countries)	3
2017/10/29	2017/10/31	Yuki Kudo	Japan	AIST	Group Leader	Thailand, Bangkok	e-ASIA Workshop (6 countries)	3
2017/10/29	2017/11/1	Anugerah Widiyanto	Indonesia	Agency for the Assessment and Application of Technology (BPPT), Indonesia	Director, Head of Technology Based Business Incubation Center (BIT)	Thailand, Bangkok	e-ASIA Workshop (6 countries)	4
2017/10/29	2017/11/1	Bounmy Keohavong	Lao	Souphanouvong University	Director, Office of Academic Research	Thailand, Bangkok	e-ASIA Workshop (6 countries)	4
2017/10/29	2017/11/1	Ei Ei Htwe	Myanmar	Mechanical Engineering Dept., Mandalay Technological University	Professor	Thailand, Bangkok	e-ASIA Workshop (6 countries)	4
2017/10/29	2017/11/1	Nguyen Kim Thoa	Vietnam	Institute of Biotechnology, Vietnam Academy of Science and Technology	Head of Biomaterial Technology Lab.	Thailand, Bangkok	e-ASIA Workshop (6 countries)	4
2017/10/29	2017/11/1	Tran Thi Thu Huong	Vietnam	School of Transportation Engineering, Hanoi University of Science and Technology	Associate Prof.	Thailand, Bangkok	e-ASIA Workshop (6 countries)	4
2017/10/29	2017/11/1	Tuan Le Anh	Vietnam	School of Transportation Engineering, Hanoi University of Science and Technology	Associate Prof., Dean	Thailand, Bangkok	e-ASIA Workshop (6 countries)	4
2017/10/30	2017/10/31	Issei Sawa	Japan	Waseda University	Adjunct Researcher	Thailand, Bangkok	e-ASIA Workshop (6 countries)	2
2017/10/30	2017/10/31	Motoshi Hiratsuka	Japan	Waseda University	Assistant Professor	Thailand, Bangkok	e-ASIA Workshop (6 countries)	2
2018/2/27	2018/3/3	Akio Nishijima	Japan	Waseda University, EAJ	Adjunct Researcher, Project General Manager	Vietnam, Hanoi. NUST,CAST,HNU: Lao, Vientiane, MEM-HOA	Workshop	5
2018/2/27	2018/3/3	Yasuaki Maeda	Japan	Osaka Prefecture University	Emeritus Professor	Vietnam, Hanoi	Joint research : Vietnam, Lao	5
2018/3/16	2018/3/21	Motoshi Hiratsuka	Japan	Waseda University	Assistant Professor	Indonesia, South Kalimantan Lambung Mangkurat University	Research	6
2018/3/16	2018/3/21	Kanan Sato	Japan	Waseda University	Student	Indonesia, South Kalimantan Lambung Mangkurat University	Research	6
2018/3/25	2018/3/31	Akio Nishijima	Japan	Waseda University, EAJ	Adjunct Researcher, Project General Manager	Mayanmar, Yangon, Mandalay YTU・MTU・DRI: Thailand, Bangkok, KU	Workshop	7

2018/3/25	2018/3/31	Hideo Sasaki	Japan	EAJ	Project Team Member	Maynmar, Yangon, Mandalay YTU・MTU・DRI: Thailand, Bangkok, KU	Workshop	7
2018/3/25	2018/3/31	Hiroshi Onoda	Japan	Waseda University	Professor	Maynmar, Yangon, Mandalay YTU・MTU・DRI: Thailand, Bangkok, KU	Workshop	7
2018/3/25	2018/3/31	Andante Hadi Pandyaswargo	Japan	Waseda University	Adjunct Researcher	Maynmar, Yangon, Mandalay YTU・MTU・DRI: Thailand, Bangkok, KU	Workshop	7
2018/3/27	2018/3/29	Ei Ei Htwe	Myanmar	Mandalay Technological University	Professor	Myanmar, Yangon, JICA , DRI	Workshop	3
2018/11/15	2018/11/18	Masayuki Ootake	Japan	MCR	Executive Chief Engineer	Indonesia, Jakarta	Discussion	4
2018/12/16	2018/12/22	Tomoko Saeki	Japan	Tokyo Institute of Technology	Professor Emeritus	Myanmar, Yangon, Yezin Vietnam, Hanoi	Workshop	7
2018/12/16	2018/12/19	Masayuki Sagisaka	Japan	AIST	Honorary Fellow	Myanmar, Yangon, Yezin	Workshop	4
2018/12/16	2018/12/22	Akio Nishijima	Japan	Waseda University, EAJ	Adjunct Researcher, Project General Manager	Myanmar, Yangon, Yezin Vietnam, Hanoi	Workshop	7
2019/3/12	2019/3/15	Masayuki Ootake	Japan	MCR	Executive Chief Engineer	Indonesia, Jakarta	Workshop	4
2019/3/12	2019/3/15	Kinya Sakanishi	Japan	AIST	Deputy Director	Indonesia, Jakarta	Workshop	4
2019/3/10	2019/3/15	Norio Ohto	Japan	the Takeda Foundation	Senior Managing Director	Thailand, Bangkok Lao, Vientiane,	Workshop	6
2019/3/10	2019/3/15	Tomoko Saeki	Japan	Tokyo Institute of Technology	Professor Emeritus	Thailand, Bangkok Lao, Vientiane,	Workshop	6
2019/3/10	2019/3/15	Akio Nishijima	Japan	Waseda University, EAJ	Adjunct Researcher, Project General Manager	Thailand, Bangkok Lao, Vientiane,	Workshop	6
2019/5/8	2019/5/10	Andante Hadi Pandyaswargo	Japan	Waseda University	Associate Professor	Indonesia	e-ASIA Workshop (6 countries)	3
2019/8/21	2019/8/25	Andante Hadi Pandyaswargo	Japan	Waseda University	Associate Professor	Indonesia	e-ASIA Workshop (6 countries)	5
2019/9/16	2019/9/20	Andante Hadi Pandyaswargo	Japan	Waseda University	Associate Professor	Indonesia	e-ASIA Workshop (6 countries)	5
2019/9/16	2019/9/20	Motoshi Hiratsuka	Japan	Waseda University	Associate Professor	Indonesia	e-ASIA Workshop (6 countries)	5
2019/9/16	2019/9/20	Hizuki Isogai	Japan	Waseda University	Adjunct Researcher, Project General Manager	Indonesia	e-ASIA Workshop (6 countries)	5
2019/9/16	2019/9/20	Masafumi Katsuta	Japan	Waseda University	Professor	Indonesia	e-ASIA Workshop (6 countries)	5

2019/9/16	2019/9/20	Yasushi Morikawa	Japan	Waseda University	Professor Emeritus	Indonesia	e-ASIA Workshop (6 countries)	5
2019/9/16	2019/9/20	Yuji Nagai	Japan	Waseda University	Researcher (Associate Professor)	Indonesia	e-ASIA Workshop (6 countries)	5
2019/9/16	2019/9/20	Akio Nishijima	Japan	Waseda University	Adjunct Researcher, Project General Manager	Indonesia	e-ASIA Workshop (6 countries)	5
2019/9/16	2019/9/20	Hisanori Okada	Japan	Waseda University	Senior Researcher (Professor)	Indonesia	e-ASIA Workshop (6 countries)	5
2019/9/16	2019/9/20	Hiroshi Onoda	Japan	Waseda University	Professor	Indonesia	e-ASIA Workshop (6 countries)	5
2019/9/16	2019/9/20	Masayuki Ootake	Japan	MCR		Indonesia	e-ASIA Workshop (6 countries)	5
2019/9/16	2019/9/20	Masayuki Sagisaka	Japan	AIST	Honorary Fellow	Indonesia	e-ASIA Workshop (6 countries)	5
2019/9/16	2019/9/20	Tomoko Saeki	Japan	Tokyo Institute of Technology	Professor Emeritus	Indonesia	e-ASIA Workshop (6 countries)	5
2019/9/16	2019/9/20	Hideo Sasaki	Japan	EAJ	Project Team Member	Indonesia	e-ASIA Workshop (6 countries)	5
2019/9/16	2019/9/20	Kazuhiro Takeuchi	Japan	AIST		Indonesia	e-ASIA Workshop (6 countries)	5
2019/9/16	2019/9/20	Syvang Xayyavong		Center for Research and Analysis, Research Institute for Energy and Mines(REM), Ministry of Energy and Mines	Head of Center for Research and Analysis	Indonesia	e-ASIA Workshop (6 countries)	5
2019/9/16	2019/9/20	Ei Ei Htwe	Myanmar	Mandalay Technological University	Professor	Indonesia	e-ASIA Workshop (6 countries)	5
2019/9/16	2019/9/20	Nuwong CHOLLACOOP		National Metal and Materials Technology Center (MTEC)	Head of Renewable Energy Laboratory	Indonesia	e-ASIA Workshop (6 countries)	5
2019/9/16	2019/9/20	Nguyen Duc Khanh		School of Transportation Engineering (STE) Hanoi University of Science and Technology (HUST)	Researcher, STE	Indonesia	e-ASIA Workshop (6 countries)	5
2019/11/26	2019/11/30	Akio Nishijima	Japan	Waseda University	Adjunct Researcher	Thailand, Myanmar	Discussion	5
2019/11/26	2019/11/30	Tomoko Saeki	Japan	Tokyo Institute of Technology	Professor Emeritus	Thailand, Myanmar	Discussion	5
2019/11/26	2019/11/30	Masayuki Sagisaka	Japan	AIST	Honorary Fellow	Thailand, Myanmar	Discussion	5
2019/12/19	2020/1/30	Uswahh	Indonesia	University of Indonesia	Professor	Japan, Tokyo, Waseda Univ. Tokyo Univ.	Research	43

Total (Person)

71

Total (Person-day)

364

Lists of Achievements and Implemented Activities

5. Patent Applications

5. 1 Independent Applications by Single Team

Application Number	Name of Patent/Patent Name	Application Date	Patent Applicants (Fill in All Members)	Publication Number (leave blank if unpublished)	Inventor	Country of Application	Registration Number (leave blank if unregistered)	Country Name of the Team

0

Total (Number of Application)

0

Total (Number of Registration)

5. 2 Joint Applications

Application Number	Name of Patent/Patent Name	Application Date	Patent Applicants (Fill in All Members)	Publication Number (leave blank if unpublished)	Inventor	Country of Application	Registration Number (leave blank if unregistered)

0

Total (Number of Application)

0

Total (Number of Registration)

Lists of Achievements and Implemented Activities

6. Awards

Date of Award	Name of Award	Recipient	Remarks	Country Name of the Team
2019/4/17	The Nihon Keizai Shimbun“Practical research on-site in East Asia that opens up the global age”			Japan
2020/3/11	Environmental Engineering Symposium Research Encouragement Award, Japan Society of Mechanical Engineers	Andante Hadi Pandyaswargo		Japan

2

 Total