

e-ASIA Joint Research Program Progress 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. Principal Investigators:
 - Japan: Katsuta Masafumi, Prof. , Environmental Research Institute of Waseda University
 - Planned Funding Period: April 1, 2017 ~ March 31, 2020
 - Thailand: Paritud Bhandhubanyong, Prof. , Panyapiwat Institute of Management
 - Planned Funding Period: April 1, 2017 ~ March 31, 2020
 - Vietnam: Tuan Le Anh, Prof. , Hanoi University of Science and Technology
 - Planned Funding Period: April 1, 2017 ~ March 31, 2020
 - Indonesia Anugerah Widiyanto, Director , Agency for the Assessment and Application of Technology
 - Planned Funding Period: April 1, 2017 ~ March 31, 2020
 - Myanmar: Ei Ei Htwe, Head of Mechanical Engineering Department, Mandalay Technological University
 - Planned Funding Period: April 1, 2017 ~ March 31, 2020
 - Lao: Bounmy Keohavong, Prof. , Souphanouvong University
 - Planned Funding Period: April 1, 2017 ~ March 31, 2020

4. Summary of the Progress 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 will together conduct a collaborative study (i.e. needs of each country, sustainable starting materials, effective conversion technologies, LCA, etc.) that will facilitate social implementation of biomass energy in East Asia.

In terms of division of work, ASEAN countries as core, will determine the volume and species of biomass that can be produced. Meanwhile Japan will work together with such ASEAN countries and create utilization scenarios, by country, soil and climate characteristics. In addition, Japan, Thailand, Indonesia, Vietnam, etc. will take the lead in technological aspect and prepare a LCA appropriate technological scenario. These results will be consolidated. We have set a goal of establishing a biomass energy introduction strategy based on clear understanding of differences in social systems by country and region.

The above approach will help to share biomass energy strategies across East Asia and promote science and technology exchanges amongst six countries 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.

October 2017 meeting in Thailand dealt with a variety of topics regarding biomass without a clear focus and therefore were unable to deepen the argument. Reflecting the experience, this time, we will consolidate the opinion after first separately discussing individual issues and general issues.

On the issue of starting materials, biomass production in six countries was quantified by type, and accuracy of the available amount as energy source advanced. Biomass production of six countries was extracted from research papers and national statistics, and we developed a tool to share it through the website. In addition, we have been working on biomass utilization in non-electrified areas, which are difficult to grasp in national statistics, etc.

For the purpose of clarification and listing of the corresponding (relevant) technologies, technological development efforts in East Asia, currently being developed in various forms were captured. This include comprehensive (extensive) information on development of biomass energy conversion technologies and systems by country/region and biomass type.

In terms of methodology we evaluated the degree of maturity of technology objectively, and made an assessment by TRA (Technology Leading Assessment), which is attracting much attention as a method of utilization for the dissemination strategy and policy recommendation.

In addition, we are linking these starting materials and technology development data on GIS, and are considering ways of aggregating information. By putting it together in GIS, we aim to visualize the national strategy of biomass utilization depending on the amount of production of the starting material, together with the above strategic study.

Furthermore, as an overall strategic construction, we have conducted trend survey and examination related to the industrialization of promising bioenergy through a study meeting of industry, academia and government members. In this process, we visited partner countries, held workshops with industry-academia-government members of each country, We also held meetings for two-country cooperation and/or wider-area cooperation. Based on these interviews, we are in process of making a matrix table on the social implementation of bioenergy for each country (region) in line with the technological development status of each country and industrial policy. We intend to share the matrix among partners. Furthermore, we are considering making a comprehensive strategic recommendations for biomass promotion in Asia.

The partner country's assistance for network construction was afforded in such areas of obtaining research funds to promote bilateral and trilateral cooperation on individual important issues. It was a fruitful work and effort. For instance we were able to conduct the fact-finding study of energy use in Myanmar with a young generation as the young generation collaborative project. Therefore we believe It was a fruitful work and effort.

5. Scientific Achievements and Implemented Activities (Research Exchange, Workshop, Publication, etc. if any):

Please refer to the attached sheet.

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

- Creation of an efficient regional consultation mechanism for extensive biomass relate issues (including agriculture and manufacturing) with the objective of making wider, optimal utilization of environmentally friendly resources in the ASEAN region.
- Creation of a structure for multi-faceted information on biomass related research areas
- Creation of a dynamic interdisciplinary process of innovation targeting smart utilization or resources.
- Hands-on training of young researchers who will be leading research and innovation on biomass in their own country.

7. Recommendations and Comments to the Program (if any):

(ex. Any support to request from the Program in order to achieve item 6.)

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, Chanhsumone 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 | |
| 3 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 | | |
| 3 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. |
|----------------------|----------------------|--|
| 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. |
| 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 IN FY 2016 |
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Total

2. 2 Conference Presentations (by Single Team)

| Date | Type of Presentation | Speaker, "Title", Conference Name, Location etc. | Country name of the team |
|-------------------------------|----------------------|--|--------------------------|
| 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 (ENEKEN), 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 |
| December 2018 | Oral Presentation | Ihara, I., Pandyaswargo, 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, December 2018 | Japan |
| October 2018 | Oral Presentation | Kenta Omura, Andante Hadi Pandyaswargo, 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, October 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 2018 | Oral Presentation | Itsuki Miyahara, Omura Kenta, Onoda Hiroshi, Actual measurement evaluation of small and medium scale woody biomass gasification power generation system, 28th Environmental Engineering Symposium, Tokyo, July 2018 | Japan |
| 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 Environmental Engineering, Tokyo, 2018 | Japan |
| February 2019 | Oral Presentation | Da Pang, Andante Hadi Pandyaswargo, 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, February 2019 | 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 2019. | 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 suppliable 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 |

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| 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 |
| February 2019 | Guest/Invited Speaker | Andante Hadi Pandyaswargo, Guideline Development on Anaerobic Digestion for MSWM, The 3R International Scientific Conference on Material Cycles and Waste Management, Bangkok, Feb 2019 | Japan |
| May 2019 | Guest/Invited Speaker | Andante Hadi Pandyaswargo, Off-grid energy use and biomass energy utilization in emerging southeast Asia, RCAPS Seminar, Oita, May 2019 | Japan |
| May 2019 | Guest/Invited Speaker | Andante Hadi Pandyaswargo, Biogas guideline for decision makers and practitioners, Technology Solutions for Holistic Waste Management – A Global Dialogue with the Private Sector, Osaka, May 2019 | Japan |
| 23-Mar-17 | 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 |
| 18 | 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 Unversity | 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 |
| March 14, 2019 | Akio Nishijima | Lao-Japan e-ASIA Workshop | Ministry of Energy and Mines, Vientiane, Lao | 25 | Discussion on bilateral and Cooperation |

13 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) |
|-------------------|----------------|------------------------|------------------------|--|---|--|---|---|
| 2017/7/31 | 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 |
| 2017/10/29 | 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 |
| 2018/2/27 | 2018/3/3 | Yasuaki Maeda | Japan | Osaka Prefecture University | Emeritus Professor | Hanoi, Vietnam | Joint research : Vietnam, Lao | 5 |
| 2018/3/27 | 2018/3/29 | Ei Ei Htwe | Myanmar | Mandalay Technological University | Professor | Myanmar, Yangon, JICA , DRI | Workshop | 3 |
| | | | | | | | | 0 |

Total (Person) 10

Total (Person-day) 42

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 |
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Total (Number of Application)

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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) |
|--------------------|----------------------------|------------------|--|--|----------|------------------------|--|
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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 |
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Total