JGSEE

The Joint Graduate School of Energy and Environment

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Consortium involving five leading institutions

CENTER FOR ENERGY TECHNOLOGY AND ENVIRONMENT

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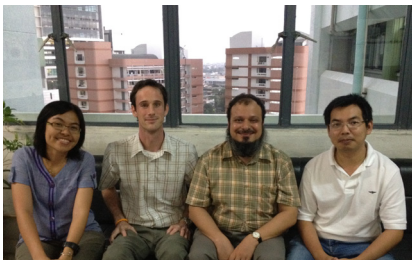
Outstanding Contribution

Dr Shabbir H Gheewala, first full professor of JGSEE and in LCA in Thailand

JGSEE is once again very happy to congratulate Dr Shabbir H Gheewala on the formal announcement of his professorship. He is the first full professor in life cycle assessment (LCA) in Thailand. In only 10 years, Prof Shabbir has demonstrated his scientific leadership and continued involvement in his area of research, that is, LCA and sustainability, with 6 book chapters and almost 100 refereed international journal papers to his credit. He has also served as principal investigator (PI) and co-PI in more than 30 research and consultancy projects, with funding from local and international organizations. He is on the editorial board of several international journals and also holds an adjunct professorship at the University of North Carolina Chapel Hill, USA. He has been on several national and international scientific committees, particularly in the areas of carbon footprint and sustainability assessment of energy systems.



LCSAL team at JGSEE

He works extensively with government and research organizations (e.g. Thailand Greenhouse Gas Management Organization, National Metal and Materials Technology Center, Office of Agricultural Economics, Food and Agricultural Organization of the UN, Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ), National Institute for Advanced Industrial Science and Technology, Japan) as well as industries (e.g. Siam Cement Group, Charoen Pokphand), providing training as well as research support. Recognizing his expertise in life cycle assessment, the National Science and Technology Development Agency has recently awarded him a grant for mentoring 10 researchers (5 post-docs and 5 PhDs) in this field. This has led to the establishment of the "Network on LCA and Policy Research on Food, Fuel and Climate Change".

He leads the Life Cycle Sustainability Assessment Lab (LCSAL) at JGSEE and his current projects are focused on sustainability assessment of biofuels, particularly in the areas of carbon and water footprinting. The carbon footprint efforts are geared towards the development of a user-friendly tool for product carbon footprinting for industries (in collaboration with Kasetsart University on an EU-funded project) as well as contributing to the national product carbon footprint methodology development. For water footprinting, water stress indices are being developed for Thailand and several agro-food industries are being helped in computing the water footprint of their products (in collaboration with Kasetsart University). The LCSAL is ably supported by several colleagues at JGSEE, particularly Dr Sébastien Bonnet, Dr Thapat Silalertruksa and Ms Pariyapat Nilsalab in addition to a host of graduate students.

Contribution to Industrial Arena

RE-Asia 2012, success story

JGSEE & UBM team, September 2012

In early June 2012, JGSEE-CEE along with the show organiser, UBM Asia (Thailand), organized a special International Conference on "Renewable Energy Asia 2012: Proving Its Worth Here and Now". This regional conference and exhibition showcased the increasing significance and viability of renewable energy and energy efficiency in Asia and beyond. The event was run in conjunction with Renewable Energy / Entech Pollutec Asia/ Pumps & Valves Asia Exhibition at BITEC. This event gathered participants from both the private and public sector with a strong involvement from the Industry. As a result of the success of RE-Asia 2012, which has now become one of the environmental exhibitions of utmost importance and relevance in the ASEAN region, UBM visited JGSEE on 10 June 2012 to report on the outcome of the event and compliment JGSEE for its technical contribution. Don't miss the next RE-Asia in June 2013.

Contribution to Research Arena

Appropriate MRV for rice field in Thailand

Assoc Prof Dr Sirintornthep Towprayoon, Assoc Prof Dr Amnat Chidthaisong and Ms Tassanee Jiaphasuanan are involved in an 18 months TRF funded project on "Appropriate method for measurement, reporting and verification in the agriculture sector: A case-study of rice field".

Rice is a major food crop in Thailand, covering 50% of arable land and greenhouse gas emissions from rice cultivation contribute 13% of the country's total greenhouse gas emissions. Appropriate methods for Measurement, Reporting and Verification (MRV) are necessary to declare greenhouse gas emissions and potential reduction options following Nationally Appropriate Mitigation Actions (NAMAs). However, MRV is a new issue for rice field in Thailand. For the assessment of GHG emissions from rice field, those can be done based on direct emission measurements, using modeling tools or following IPCC guidelines. For reporting, information is to provided regarding the project boundary, baseline emissions, project emissions, emission reduction, measurement methods, mitigation options and quantification of uncertainties. Considerations of accuracy, practical applications and costs are key factors for choosing the right approach.

In this project, focus is primarily on producing suitable measurement, reporting and verification methods for Thailand (T-MRV). This work is expected to result in the publication of a T-MRV guideline for greenhouse gas reduction in rice field. This guideline will be useful for the preparation of reporting for NAMAs, GHG inventories and carbon footprints.

Water footprinting of food, feed and fuel for effective water resource management

The Life Cycle Sustainability Assessment Lab (LCSAL) has been conducting a project on the water footprinting of food, feed and fuel funded by the Thailand Research Fund. This one year project (April 2012 – March 2013) will review and test the various available water footprint methodologies to adapt a suitable one to the Thai context. Water stress indices are currently being developed for the whole country based on regions and watersheds. The final goal is to come up with a robust water footprint assessment methodology for Thailand and make recommendations on water resource management. The project is led by LCSAL (Prof Shabbir H Gheewala, Dr Thapat Silalertruksa and Ms Pariyapat Nilsalab) in collaboration with Kasetsart University and the Asian Institute of Technology.

Global assessments and guidelines for sustainable liquid biofuels production in developing countries

The Life Cycle Sustainability Assessment Lab (LCSAL) recently participated in an international project aiming to identify and assess sustainable systems for the production of liquid biofuels both for transport and stationary applications. LCSAL's particular contribution was on the socio-economic impact assessment of biofuels for Thailand. The project was funded by the Global Environmental Facility (GEF), United Nations Environmental Program (UNEP), Food and Agriculture Organisation of the United Nations (FAO) and United Nations Industrial Development Organisation (UNIDO).

The final report is available at:
http://www.unep.org/bioenergy/Activities/TheGlobalEnvironmentFacilityGEFProject/tabid/79435/Default.aspx

Contribution to ASEAN Community

Study of the energy efficiency and conservation strategic plan of Thailand for AEC in 2015

High economic growth results in increasing energy demand especially for developing countries. Even though ASEAN countries possess fossil energy reserves, those appear to be limited in comparison with the predicted energy demand for the future. To reduce energy consumption at national level, energy efficiency and conservation (EE&C) measures appear to be the most effective options. According to past experiences, Thailand is the leader on EE&C activities in the region. Thailand has already prepared a national energy conservation plan with challenging targets, efficiently implemented energy labeling for various equipments, and encouraged improving efficiency of energy use in various industrial sectors with adequate financial tools for operation. Many countries in the region have been working on strengthening EE&C to reduce energy consumption. Therefore, transferring expertise from Thailand in the field of EE&C to other countries of the region would be helpful and beneficial for the sustainable development of ASEAN.

In order to be ready for the ASEAN Economic Community (AEC) in 2015, it is important for Thailand to have a suitable strategic plan in order for the country to maintain its competitive role as well as support the development of other countries in the region. Thailand may provide help as well as training, and technical support for the member countries to acquire know-how and develop energy technologies that are consistent with energy efficiency and conservation measures. The EE&C strategic plan of Thailand for AEC would help to encourage the private energy business sector of Thailand to join investment with the private business sector of ASEAN member countries in order to stimulate potentials for investment in EE&C in the future.

JGSEE visits universities in Asia for research and academic collaboration

During 5-8 June 2012, Assoc Prof Dr Amnat Chidthaisong and Assoc Prof Dr Navadol Laosiripojana visited Bogor Agriculture University and the Center for International Forestry Research (CIFOR) to discuss possible research and academic collaborations. The idea of developing a dual-degree master program between JGSEE and Bogor Agriculture University was proposed from which further action will follow in the near future.

During 6-10 August 2012, Assoc Prof Dr Bundit Fungtammasan, Dr Boonrod Sajjakulnukit and Assoc Prof Dr Navadol Laosiripojana visited Seoul National University and Korea Institute of Energy Research (KIER) to learn and exchange ideas on research funding management, technology evaluation, and R&D promotion and policy.

During 27-29 August 2012, along with KMUTT International Affairs Office, Assoc Prof Dr Navadol Laosiripojana visited the National Kaohsiung First University of Science and Technology, Kaohsiung Science Park, Taiwan tech and the National Taipei University of technology to discuss possible research and academic collaborations. A discussion on developing a dual-degree master program between JGSEE and the National Taipei University of technology was initiated at the time.

Contribution to Knowledge Platform

First consortium research conference held at JGSEE in August 2012

Opening and welcome remarks by
Assoc Prof Dr Sirintornthep Towprayoon, Director, JGSEE

JGSEE-CEE successfully organized "The First Consortium Research Conference" on 17 August 2012 at KMUTT, Bangkok. Over 70 participants from KMUTT, KMUTNB, CMU, PSU and SIIT-TU joined the event. The representatives of JGSEE and consortium partners were provided with information concerning the revised research foci and plans set for JGSEE-CEE. Discussions were then held on how JGSEE and the partner universities can initiate joint research/programs and how JGSEE can help strengthening co-activities with the various universities of the consortium. It was agreed among all participants that research based collaboration is essential for the achievement of JGSEE-CEE activities.

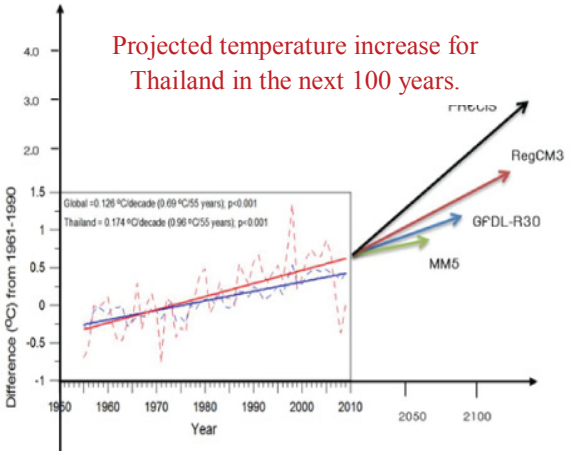
Achievements of THAI-GLOB

The Thailand Research Fund's Coordinating and Research Development Center on Global Warming and Climate Change (THAI-GLOB) is based at JGSEE since 2006 and led by Assoc Prof Dr Amnat Chidthaisong. Supported by The Thailand Research Fund and JGSEE, the aims of this Center are to improve understanding of climate change science, evaluation of climate change impacts and adaptation to climate change in Thailand, and building capacity of Thai researchers in the area of climate change science and its impacts.

Since its establishment, THAI-GLOB has worked in facilitating project proposal submission, project proposal evaluation, and dissemination of research results. In the last 6 years, 30 projects have won the support from TRF. The emphasis is on improving understanding of climate change science in Thailand such as past climatology, analysis of climate modes, the impacts of climate change on agricultural productivity and on water resources, and climate modeling. An important output from THAI-GLOB is the production of the three-volumes of the 1st Thailand Assessment Report on Climate Change. This is as an important reference for Thai climate change information. All the project final reports, assessment reports, and books produced under THAI-GLOB can be downloaded free of charge at http://climatechange.jgsee.org

Besides coordinating climate change research in Thailand, THAI-GLOB is now collaborating with the The National Natural Science Foundation of China (NSFC). This aims at strengthening collaborations between Chinese and Thai researchers on topics related to climate change. Currently, there are 7 ongoing projects under this collaboration.

Last year, THAI-GLOB received the 2011 TRF Outstanding Research Award as an acknowledgement of its contribution to improving understanding on climate change science and its impacts in Thailand.



Contribution to National Policy

EGAT and NSTDA fund project to assess energy security of energy supply for power generation in Thailand

At present, Thailand relies heavily on the supply of natural gas for electric power generation. Natural gas contributes more than 70% of the country's total primary energy supply. While this demand in natural gas has been continuously increasing over the past years, the largest reserve of natural gas of Thailand in the Gulf of Thailand has been gradually declining. As a result, Thailand is faced with the necessity of increasing its importation of natural gas from neighboring countries. This difficult situation has led the Thai government to revise the Power Development Plan (PDP), announced in 2010, to a new plan of PDP 2010, revision 3, for this year (2012). In this revised version, other types of primary energy resources are included, notably nuclear energy and coal energy.

The Thai authorities are planning over the next 20 years to install new nuclear power plants (2,000 MW) and coal-fired power plants (4,400 MW). From a theoretical point of view, this plan should strengthen the country's energy supply security as a result of enhanced diversification of its primary energy supply resources. Unfortunately, in practice, this is an uneasy task since several surveys have reported that a large majority of the public tends to oppose to the development of nuclear power in the country. The development of large coal-fired power plants also faces serious protests from local communities. Consequently, it is still uncertain the latest PDP plan can achieve the targets set for power generation or not. If the targets cannot be achieved as planned, this could lead to inadequate electric power supply, or even black out in the near future, unless other alternatives are considered.

In this regards, a study of energy security for Thailand has been proposed by Assoc Prof Dr Chumnong Sorapipatana. This study aims at investigating all possible options for primary energy supply for electricity generation, including with and without the development of new nuclear power plants and new large coal-fired power plants. This assessment will be performed in conjunction with the reduction of electric power demand through energy conservation programs. Energy security will be explored looking at various alternatives of energy supply. But in this study, the diversity of primary energy supply will not be the only aspect investigated; others related to power development will also be looked at including CO_2 emissions, cost of electricity generation, etc.

The results of this study should reveal what are the implications of each of the alternatives considered, and enable policy makers and the public to choose the option providing the least impact while still fulfilling the increased demand for electricity. This research proposal has been accepted and granted by EGAT and NSTDA.

TGO assigns JGSEE and Chulalongkorn University on projection of GHG emissions for the energy and non-energy sector in Thailand

To meet the challenges of climate change and economic development as well as the growing energy needs in Thailand, appropriate policy measures and technology options are essential. Aspects of main concern include the identification of technologies/policies that could play a key role in the energy and non energy sector, the costs and benefits of the selected technologies, and the policies Thailand should consider especially for the energy sector.

To address the above, JGSEE-CEE in cooperation with the Faculty of Economics at Chulalongkorn University were assigned by the Thailand Greenhouse Gas Management Organization (TGO) to develop a projection of greenhouse gas emissions and mitigation using modeling and economic assessment for the energy and non-energy sector.

In this project, updated scenarios for the period 2010 - 2050 are investigated to evaluate which polices/new technologies will be most important in the energy and non energy sector. The assessment is performed following the IPCC 2006 Guidelines and using the Long range Energy Alternative Planning system (LEAPs) modeling tool. The four scenarios considered in this ongoing project include 1) Business as usual, 2) Official policy, 3) New policy and 4) Stringent policy.

The Joint Graduate School of Energy and Environment

Contribution to Society

Guidelines for flood waste management in urban area

Following the International Seminar on "Flood Waste Management in Urban Area – Lessons Learned in the Aftermath" that was jointly organized by JGSEE and the National Institute for Environmental Studies (NIES, Japan), on 20 March 2012, a draft guideline document for flood waste management in urban area was produced. This document compiles all the information that was shared by the experts of this event.

In order to disseminate this useful information to waste management operators at local scale, JGSEE-CEE, NIES, and the Bangkok Metropolitan Authority (BMA) organized a "Workshop on flood waste management and the role of local practitioners" on 31 July 2012 in Bangkok. Experiences on flood waste management were shared among the participants and the guideline document for flood waste management in urban area disseminated to the 80 BMA officers that participated to the workshop.

Workshop on flood waste management and the role of local practitioners, 31 July 2012, Bangkok

Site visits and training on renewable energy for local researchers of Ban Pred Nai

JGSEE-CEE and the Good Governance for Social Development and the Environment Institute (GSEI) with support from the Thailand Research Fund (TRF) and Thai Health Promotion Foundation successfully organized site visits and training on renewable energy during 1-2 September 2012 in Nakorn Ratchasima Province. The training was provided to local researchers of Ban Pred Nai with focus on the management and use of renewable resources for heat and power applications.

The first site visit at the Nakhonratchasima Municipality focused on the production of organic fertilizer and electricity from municipal solid waste. A biomass power plant from the Khonburi Subdistrict Administrative Organization was then visited. It is a small power plant with a capacity of 100 kW using wood scraps, coconut shell, and other such materials as fuels. The next visit concerned the waste management technologies that have been established at the Center of Excellence in Biomass at Suranaree University of Technology. The wastes from nearby households are transported to this site, cut into small pieces using a propeller before being separated. The plastic waste is compressed using an extruder before being transported to some other places for further processing. Food waste and biomass waste are used to produce organic fertilizers. The All Green Learning Center (AGLC) was then visited. There solar cells are used to produce electricity for various applications. The last visit in Saraburi province concerned the fixed dome type biogas production system using pig manure that has been set to supply Nong Khae community with energy for cooking.

OAE and JGSEE lead a public hearing on the development of a greenhouse gas emissions database for the agricultural sector of Thailand

Ms Rachanee Songanok,
Senior Expert, OAE

The Office of Agricultural Economics (OAE) and the Joint Graduate School of Energy and Environment (JGSEE), successfully organized the Public Hearing on The Development of a Greenhouse Gas Emission Database for the Agricultural Sector which was held on 25 June 2012 at the Office of Agricultural Economics. Presentations were delivered on GHG emissions and mitigation options as well as strategies for carbon sink in soil in the agricultural sector. Also information was provided on the development of a GHG emission database for the agricultural sector. This concerns 9 major agricultural products: rice, corn, sugar-cane, cassava, oil palm, para-rubber, pig, chicken and shrimp. The results of the GHG emission calculations for the 9 products considered and an example of the database developed were also shared. This database will be used by OAE as template to prepare the basic information required for GHG emissions calculation at the national level. The meeting was a success gathering 85 participants from academia as well as representatives from the private and government sector.

Contribution to International Organizations

JGSEE is pleased to welcome Dr Milou Beerepoot as new visiting faculty

JGSEE is pleased to welcome Dr Wilhelmina Maria Catharina Beerepoot (Milou Beerepoot) as new visiting faculty and advisor in renewable energy since August 2012. Dr Milou received her PhD degree in innovation systems in relation to encouraging a transition towards a low-carbon building sector from Delft University of Technology (NL).

Dr Milou is also a strategy manager on energy efficiency at GIZ/CIM and a senior renewable energy analyst at the International Energy Agency. Prior to that, for over 10 years, she occupied various positions in differents organisations working in areas related to market data, energy efficiency and policies in renewable energy. She notably occupied positions as assistant professor/ senior researcher at Delft University of Technology, visiting research fellow at the School of Architecture, University of Liverpool (UK), owner/consultant at WMCB Consultancy, and consultant at Damen Consultants as well as W/E Consultants Sustainable Building. Her research interests are focused on analyses of market data and policies in renewable energy for heating and cooling.

In her new postion at JGSEE, Dr Milou will help strengthening the school's capacity in providing education and training, R&D and technical services, particularly through linkages with German and international institutions. Part of this will be performed through a GIZ project on "National Energy Efficiency Plan as Core Element of an Action and MRV-based Emission Reduction Strategy, Thailand". JGSEE has also been commissioned by EPPO for this project to develop a National Energy Efficiency Plan.

Newcomers

JGSEE welcomes new researchers

Dr Atit Tippichai received his PhD degree in Transportation Engineering and Socio-Technology from Nihon University, Japan in 2010. He has been working since then as a postdoctoral research fellow at JGSEE. At present, he is a researcher under the Energy and Environmental Policy Laboratory (EEPL).

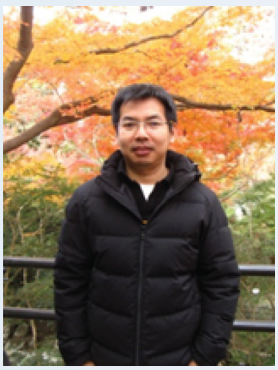
His main research interests are Climate Mitigation Options in Developing Countries, GHG Reduction Potentials and Costs by Bottom-up and Top-down Approaches, Energy Efficiency and CO_2 Reductions in the Transport Sector, and Land Use-Transport-Energy-Air Pollution- Climate Modeling.

Dr Janewit Wannapeera received his PhD in Energy Technology from JGSEE in 2012. When He was a PhD student, he also worked as a research assistant as part of a collaborative project between JGSEE and Kyoto University.

His main research interests include the upgrading of low-grade solid fuels (biomass and low rank coal) for effective energy conversion, the pyrolysis and gasification of biomass materials and the production of carbon fiber from biomass wastes.

Dr Surawut Chuangchote received his BEng (2004) and MSc (2006) from Silpakorn University and Chulalongkorn University, respectively. He completed his PhD degree in energy science from Kyoto University, Japan in 2009. Prior to coming back to Thailand, he served as a researcher (6 months) and a postdoctoral research fellow (JSPS fellowship, 2 years) in energy technology at Kyoto University.

He has published more than 17 scientific papers in international journals and books, and received a number of awards. He is currently working as a researcher at JGSEE in the Advanced Fuel Processing Laboratory (AFPL) and Building Energy Science and Technology Laboratory (BEST). He is also working in collaboration with SEEM (KMUTT), NECTEC, MTEC, etc. His research interests focus on the development of emerging solar cells (DSSCs, organic photovoltaics, and hybrid solar cells), solar energy, nanomaterials for energy applications, photocatalysts for biomass conversion, daylighting, and energy-efficient buildings.



Dr Thapat Silalertruksa is currently a researcher at the life cycle sustainability assessment lab, the Joint Graduate School of Energy and Environment, where he graduated with PhD in environmental technology in 2011. His main research interests include sustainability assessment of bio-energy systems, life cycle assessment (LCA), carbon and water footprinting of agricultural products, environmental management system, environmental management accounting, cleaner technology, process optimization and control.

Prior to his PhD studies, Dr Thapat worked for 10 years as a senior engineer at the Thailand Environment Institute where he focused on the promotion and implementation of environmental management systems and cleaner production technologies for various industries in Thailand.

Events

Thai-German advanced training on renewable energy

JGSEE in collaboration with 4 German universities, including HTW Berlin, TU Hamburg-Hamburg, FH Trier and FH Stralsund, successfully organized the Thai-German Advanced Training on Renewable Energy during 3 – 22 September 2012 at KMUTT. The event was financially supported by DAAD, the German national agency for the support of international academic cooperation.

During this 3 weeks event, lectures were delivered on topics covering: Bioenergy, Integrated Renewable Energy Systems including Hydrogen & PV Systems and Solar Thermal Systems Planning for Engineers and Practitioners. Also several field visits were organized, including to a Biomass Power Plant at Shaiya-AA Power Plant in Chonburi as well as SOLARTEC and NANOTEC – NSTDA in Pathumthani, of a solar thermal system installed at Thai Union Manufacturing Co., Ltd., and of a laboratory on Catalysis for Biofuel Conversion Process at KMUTT. The event was very well received with a total of 30 participants mainly from academia attending the training.

Franco-Thai summer school on bio-energy technology and assessment

JGSEE with financial support from the French Embassy as well as CIRAD and NSTDA successfully organized the Franco-Thai Summer School on Bio-Energy Technology and Assessment (BETA) held during 15-26 October 2012 at KMUTT, Thailand. During 15-18 October 2012, lectures were delivered on Biomass-to-Energy Technologies, Liquid Biofuels Production and Sustainability, and Clean Combustion. A CleCombi network meeting was also held on 19 October with participants from Thai and French research organizations to discuss potential ways of collaboration. During 24-26 October site visits were made including to the Laboratory facilities of KMUTT, KMUTNB and MTEC, NSTDA as well as to the Siam Cement Group at Kanchanaburi. The summer school was a great success gathering over 80 participants from academia as well as private and government sectors.

Contact and Information

The Joint Graduate School of Energy and Environment
King Mongkut's University of Technology Thonburi,
126 Prachauthit Rd. Bangmod, Tungkru, Bangkok, Thailand 10140
Tel. (662) 470 8309-10 Ext 4130, Fax. (662) 470 8355
E-mail : pro@jgsee.kmutt.ac.th

Advisors:
Assoc Prof Dr Sirintornthep Towprayoon
Assoc Prof Dr Bundit Fungtammasan
Assoc Prof Dr Savitri Garivait

Editor:
Dr Sebastien Bonnet

Assistant to Editor:
Ms Siriya Seneewongse Na Ayudthaya