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Yangon Technological University

Yunnan University

## GMSARN Associate Members

Chitralada Technology Institute

Maharakham University

Suratthani Rajabhat University

# PROGRAM

The 14<sup>th</sup> GMSARN International Conference 2019 on

**Smart Energy, Environment, and Development  
for Sustainable in GMS**

27-29 November 2019

The Grand Luang Prabang, Luang Prabang, Lao PDR

Organized by



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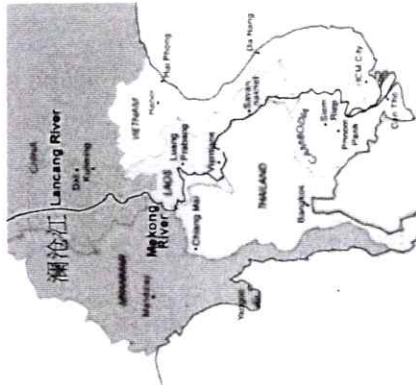


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## About GMSARN



The Greater Mekong Subregion (GMS) consists of Cambodia, China (Yunnan & Guangxi Provinces), Laos, Myanmar, Thailand and Vietnam.

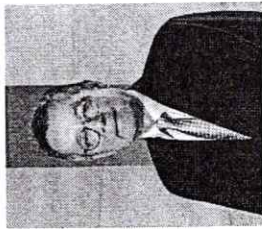
The Greater Mekong Subregion Academic and Research Network (GMSARN) is composed of sixteen of the region's top-ranking academic and research institutions. GMSARN carries out activities in the following areas: human resources development, joint research, and dissemination of information and intellectual assets generated in the GMS. GMSARN seeks to ensure that the holistic intellectual knowledge and assets generated, developed and maintained are shared by organizations within the region. Primary emphasis is placed on complementary linkages between technological and socio-economic development issues.

The GMSARN current member institutions are the Asian Institute of Technology, Pathumthani, Thailand; The Institute of Technology of Cambodia, Phnom Penh, Cambodia; Kunming University of Science and Technology, Yunnan Province, China; National University of Laos, Vientiane, Laos PDR; Yangon Technological University, Yangon, Myanmar; Khon Kaen University, Khon Kaen Province, Thailand; Thammasat University, Bangkok, Thailand; Hanoi University of Technology, Hanoi, Vietnam; Ho Chi Minh City University of Technology, Ho Chi Minh City, Vietnam; The Royal University of Phnom Penh, Phnom Penh, Cambodia; Yunnan University, Yunnan Province and Guangxi University, Guangxi Province, China; Nakhon Phanom University, Nakhon Phanom Province, Thailand; and Ubon Ratchathani University, Ubon Ratchathani Province, Thailand, Naresuan University, Phitsanulok Province, Thailand and other associate members are Chitralada Technology Institute, Mahasarakham University, and Suratthani Rajabhat University.

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## Greetings from Conference Chair



It is my great honor to chair the 14th GMSARN International Conference 2019 on “*Smart Energy, Environment and Development for Sustainable GMS*”. On behalf of the organizing committee, I take this opportunity to welcome all of you to this prestigious international conference.

Due to the fast-growing economy and population in the GMS region, energy security, environment, and climate change are of great concern. The importance of developing “smart energy, environment, and development” based on the use of green technologies for local energy supply and demand-side management combined with smart technology will become increasingly relevant to the region’s growth. In addition, decentralized energy systems, together with micro-grids, can provide opportunities for deploying renewable energy resources and expanding access to clean energy services to many of GMS’s remote communities. The aim of this GMSARN 2019 is to focus on smart connectivity, environment, and sustainable development in the GMS countries to transform its future.

The conference is organized by Greater Mekong Subregion Academic and Research Network (GMSARN) and co-organized by Asian Institute of Technology (AIT) and National University of Laos (NUOL). GMSARN has also been assisted and guided by our International Advisory Committee. Cooperation has come from our co-organizers, colleagues, and friends from institutions in GMS and beyond.

I take this opportunity to thank all the co-organizers and sponsors for their dedicated support. Finally, I would like to thank once again the participants of the conference and wish that you find the conference rewarding and your stay in Luang Prabang enjoyable!

Dr. Edén Y Woon  
President  
Asian Institute of Technology  
P.O. Box 4, Klong Luang,  
Pathumthani 12120, Thailand

## Organizing Committee

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GMSARN Secretary General and Conference Executive Director  
Assoc. Prof. Dr. Vo Ngoc Dieu  
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## International Advisory Panel

Country	Name	Affiliation
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Thailand	Andrew Ingles	IUCN Asia Regional Office
UK	Jonathan Rigg	Durham University
USA	Dennis Ray	University of Wisconsin-Madison
USA	Jefferson Fox	East-West Center, Honolulu

## Conference Purposes

With the increasing population in Greater Mekong Subregion (GMS), more than 40% of the population in the GMS will be living in cities by 2030. The subregion is one of the least urbanized areas in the world, but its cities are growing and their economic impact is being felt. Planning is needed to balance growth with preferably green growth and inclusiveness to avoid the negative impacts of urbanization. This can be achieved through national urban strategies that ultimately lead to a GMS urban development strategy. Consequently, energy demand for the GMS is expected to reach 237,000 megawatts by 2025, a threefold increase compared to the 77,000 megawatts used in 2010 and requiring substantial investments in power system expansion. Also, balancing energy security, environmental impact and greenhouse gas emissions from energy development, and social implications within the constraints of limited supply options are imperatives of today's power development planning. The aim of this GMSARN 2019 is to focus on smart energy, environment, and development with sustainability in GMS countries to shape its future. To address these critical issues, the International Conference 2019 on "Smart Energy, Environment, and Development for Sustainable GMS" is a three-day platform for knowledge dissemination by a diverse group of researchers and participants.

The rationale of the GMSARN 2019 is to initiate and stimulate international discussions and exchange the innovative ideas. The conference can be used as an international platform on regional and trans-boundary perspectives. Therefore, it can contribute to sustainable development related to energy, environment and development. In this aspect, GMSARN conference is a unique hosting a wide range of various disciplines that would generate shared solutions and ideas to existing problems. In addition, this conference provides an ecosystem to disseminate the research and findings of development on various innovative and sustainable developments in GMS. It is also envisaged that the conference will benefit GMS education and research programs.

### Contact Address

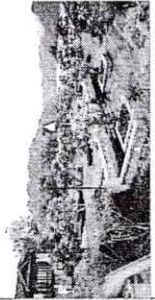


The 14th GMSARN International Conference 2019 on "Smart Energy, Environment and Development in GMS".

Weerakorn Ongsakul, PhD, CFA  
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Website: <http://www.gmsarn.com/conference2019>

### Venue



The conference venue will be held at The Grand Luang Prabang, Luang Prabang City, Lao PDR.  
Address: Ban Xiengkeo, Khet Sangkalok  
P.O.Box 1191 Luang Prabang 06000 Laos



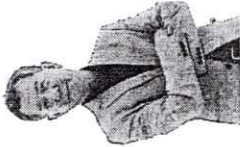
## Keynote Address 1

### “Impact of Trade War to Thailand Global Supply Chain”

**Dr. Somjai Phagaphasvivat**  
Bangkok, Thailand

Supply chains are the lifeline of today's globalization. They enable the international trade flows that empower global commerce. Supply chains are evolving to reflect the increased complexity of world trade - a highly competitive, super-connected, fast-changing and increasingly volatile global environment. With the impact of trade war, companies are rethinking of supply chain strategies. One of the effects is to relocate to countries less affected by the tariffs imposition resulted from trade war. In this context, Thailand has emerged as one of the beneficiary of the geo-political change from the region, enticed by the so-called EEC project's incentives.

*Dr. Somjai was formerly an associate professor at the Faculty of Political Science, Thammasat University, Thailand. After receiving B.A. from Chulalongkorn University, Thailand, he further studied in Europe with scholarship from both French and Spanish governments. He graduated from the University of Madrid, Spain and the University of Nancy, France with B.A., M.A., and Ph.D in political and economics. Dr.Somjai Phagaphasvivat has a wide range of experiences. Apart from his academic activities, he was political and economic advisor to ESCAP, the United Nations. He was advisor to the Securities Exchange of Thailand, advisor to a number of Parliamentary committees - economic affairs, foreign affairs, fiscal and finance including a member of special committee on drafting political party law. In his political role, he was advisor to the Prime Minister and also a senator of the Thai parliament. Dr.Somjai Phagaphasvivat is a frequent speaker in seminar on economic, business and political issues both in Thailand and overseas. He has written a number of books and articles in Thai and English and wrote a number of papers to be presented at international seminars as well. He was a contributing writer to various newspaper and journal both domestic and overseas. He is currently a consultant to public and private corporations in Thailand and a lecture on the topics "Strategic Management and Geo-Politics" in various MBA programmes among Thai leading universities.*



## Keynote Address 2

### “Zero Waste Collaborative Network”

**Mr. Wiwat Hirunpruk**  
Sustainable Fashion & Lifestyle Industrial Expert, Thailand Textile Institute  
Bangkok, Thailand

#### 1. What is sustainable living? Why we need it?

Sustainable living is a lifestyle that attempts to reduce an individual's or society's use of the Earth's natural resources and personal resources. Practitioners of sustainable living often attempt to reduce their carbon footprint and waste by altering methods of transportation, energy consumption, and waste management. Sustainability is important for many reasons including Environmental and day to day living lifestyle. In order to have healthy communities we need clean air, natural resources, and a nontoxic environment. We need to consume the energy, water, air consciously because sustainability is the passport to the future wellbeing.

#### 2. What cause us an inconvenient living?

Inconvenient living gives a community daily living trouble or annoying our social, economic, and environmental. We produce so much waste which so many billion tons end up in landfill and ocean. Waste is money, when you throw away waste means we throw away our money.

#### 3. How sustainable production and consumption restore the livable environment?

Sustainable consumption and production refer to the use of services and related products, which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product. Fast fashion is one of the examples.

#### 4. Will zero waste network and collaboration helps saving planet?

Community network and collaboration is another platform where Wastebusters to find common friends who seek how to unlocking public's knowledge and build awareness to stop waste problems. The networks both on the ground and on social media are linked throughout the world.

*Mr. Wiwat Hirunpruk Mr. Wiwat Hirunpruk is the Textile and Industrial Fashion lifestyle expert. He grew up in Shinawatra a famous silk family in Chiangmai Thailand. He has international business administration degree and continues to study Textile technology in England. He is also a pioneer and co-founder of many organizations both in Private and Public sectors. At present, He is an advisor of Fashion academic in the leading educational institutions of the country. As well as a consultant to the network agency of Ministry of Industry under named Thailand Textile Institute. With deep passion he pays very keen interest in Sustainable Development subject as well as writing a book about Sustainable fashion. Since 2011 He have established the Social Media group called "Zero Waste Thailand" which actively on Facebook and Line Open Chat to serve to rise public's awareness on sustainability matters. With his believe that the future is handmade. People can destroy and can create. With good hands and good hearts, all of us can save this sharing planet for our wellbeing young generations to come.*

## Program at a Glance (1)

Day 1: November 27, 2019 (Wednesday)	
08:00 – 08:30	Registration & Opening Session at <i>Richulieu</i>
08:30 – 08:40	Introductory Remarks by Prof. Dr. Weerakorn Ongsakul GMSARN Secretary General & Conference Executive Director
08:40 – 08:50	Welcome Address by H.E. Dr. Subin Pinkayan Chairperson of The Board of Trustees, AIT, Thailand
08:50 – 09:00	Opening Address by Prof. Emeritus Dr. Sahas Bundiitkul Chairman of Executive Committee, AIT, Thailand
09:00 – 09:15	Photo Session
09:15 – 09:45	Keynote Address 1: "Impact of Trade War to Thailand Global Supply Chain"
09:45 – 10:15	By Assoc. Prof. Dr. Somjai Phagaphasvivat, Bangkok Thailand Keynote Address 2: "Zero Waste Collaborative Network" By Mr. Wiwat Hirunpruk, Sustainable Fashion \$ Lifestyle Industrial Expert, Bangkok Thailand
10:15 – 10:30	Coffee/Tea Break – 15 minutes
Break out Session 1	
10:30 – 12:15	<i>Richulieu</i> S1.1: Energy 1
	<i>Le Bistrot</i> S1.2: Environment 1 & Development 1
12:15 – 13:00	Lunch Break at Xiengkeo Restaurant (90 minutes)
13:00 – 18:00	<b>Special Session</b> <b>@Briefing Room</b> Water-Energy-Food Nexus and Sustainable Development in the Mekong Sub-region: The Way Forward Co-organized by Asian Institute of Technology and The University of Tokyo
Break out Session 2	
13:00 – 15:30	<i>Richulieu</i> S2.1: Energy 2
	<i>Le Bistrot</i> S2.2: Environment 2 & Development 2
15:30 – 15:45	Coffee/Tea Break – 15 minutes
Break out Session 3	
15:45 – 18:15	<i>Richulieu</i> S3.1: Energy 3
	<i>Le Bistrot</i> S3.2: Development 3
18:45 – 20:30	Welcome Reception Dinner at Park Houay Mixay Restaurant
Day 2: November 28, 2019 (Thursday)	
All Day	Field Visit in Luang Prabang & Dinner (Optional)

## Program at a Glance (2)

Day 3: November 29, 2019 (Friday)	
Break out Session 4	
08.15 – 10:30	<i>Richulieu</i> S4.1: Energy 4
	<i>Le Bistrot</i> S4.2: Development 4
Break out Session 5 (Coffee/Tea Break)	
10.30 – 12:15	<i>Richulieu</i> S5.1: Energy 5
	<i>Le Bistrot</i> S5.2: Development 5
12:15 – 12:30	GMSARN2019 Recap & Closing Remarks by Prof. Dr. Weerakorn Ongsakul GMSARN Secretary General & Conference Executive Director
12:30 – 13:30	Lunch Break
13:30 – 18:00	<i>Le Bistrot</i> S6: Energy 6
End of Conference	

## Special Session

### “Water-Energy-Food Nexus and Sustainable Development in the Mekong Sub-region: The Way Forward”

27 November 2019 @Briefing Room

Co-organized by  
Asian Institute of Technology and The University of Tokyo

#### Background

Sustainable development in the Greater Mekong Sub-region (GMS) is strongly linked to the development of appropriate cooperation mechanisms between the member countries. As a typical example of the dilemma of collective actions, transboundary natural ecosystems, such as the Mekong River, and economic linkages trigger positive and negative externalities from the action of each individual member country to the region.

In order to tackle the dilemma, numerous policies top-down and bottom-up initiatives have been recently initiated to promote cooperation in the region. While there is naturally various conflicts of national interests, academia can contribute to ongoing policy discussions through evidence-based research. For, a wealth of research has been conducted in the past including a diversity of perspectives by neutral, impartial and independent research institutes.

In this context, a series of dialogues between practitioners and researchers are essentially required. Especially, this is appropriate timing to restart the discussion on the water-energy-food (WEF) nexus, when the regional power interconnection is becoming one of the urgent agendas. The upcoming GMSARN conference provides a perfect platform for launching a series of dialogues to foster academic research between regional and international experts.

#### Objective

Against the backdrop of the recent societal and technological progress, this session aims to serve as a platform for presentations and a launching discussion on upcoming research priorities under water-energy-food nexus to foster security and sustainability in the GMS.

Specifically, key discussion points shall include:

- Interlinkages between evidence-based research and national-regional policy processes.
- Review of results from previous studies on the regional optimization of natural resources in the Mekong basin. What has permeated through the regional political systems and what not?
- Opportunities from recent developments (lower costs of intermittent renewables).
- Implications for further research on the WEF Nexus approach.

## Program Schedule on November 27, 2019 in the afternoon

13:00 - 13:30	Registration
13:30 - 13:40	Opening remarks and introduction to the session Dr. Vilas Nitittannanon, Associate Professor, Department of Development and Sustainability, School of Environment, Resources and Development, AIT
13:40 - 14:15	Sub-session 1: Keynote speech: New drivers of regional power connectivity in the GMS Mr. Longfei Li, Senior Manager, Southeast Asia-South Asia Office, Global Energy Interconnection Development and Cooperation Organization (GEIDCO)
14:15 - 15:30	Sub-session 2: Technical presentations, moderated by Dr. Vilas Nitittannanon, AIT SS-01: Energy strategies to promote local distributed electricity options, grid flexibility, and sustainable livelihoods in the GMS Dr. Noah Kittner, Assistant Professor, Department of Environmental Sciences and Engineering, The University of North Carolina SS-02: SWITCH-Laos: Power Systems Investment Planning for Economic Resilience in Laos (through video-conference) Ms. Aaditee Kudrimoti, University of California-Berkeley; and Mr. Alex Latham, Yale University SS-03: Climate Change Projection and Future Climate Extremes in the Srepok River Basin Mr. Panha Hok, Department of Civil and Infrastructure Engineering, AIT SS-04: Assessment of Inflows to Hydropower Dams under Climate Change Scenarios in the Sekong River Basin Dr. Sangam Shrestha, Department of Civil and Infrastructure Engineering, AIT
15:30 - 15:50	Coffee break
15:50 - 16:40	Sub-session 3: Panel discussion, moderated by Dr. Daniel del Barrio, Project Research, Institute for Future Initiatives, U Tokyo Perspective of Water-Energy-Food Dr. John Ward, Principal Scientist, Mekong Region Future Institute From water security Dr. Sangam Shrestha, Associate Professor, Water Engineering and Management, AIT From energy security Dr. Noah Kittner, The University of North Carolina
	From food security Mr. Suthy Heng, Regional Technical Advisor/Coordinator, Environmental Management Division, Mekong River Commission (MRC)
16:40 - 17:20	Panel Discussions, moderated by Dr. Daniel del Barrio, Project Research, Institute for Future Initiatives, U Tokyo <ul style="list-style-type: none"> <li>• What are the recent and upcoming drivers and impacts in the region?</li> <li>• Emerging topic of Water-Energy-Food nexus for regional sustainable development</li> <li>• How to make the research outreach effective?</li> </ul> Panel participants (4-5 panelists): <ul style="list-style-type: none"> <li>• Mr. Longfei Li, Senior Manager, Southeast Asia-South Asia Office, Global Energy Interconnection Development and Cooperation Organization (GEIDCO)</li> <li>• Dr. John Ward, Principal Scientist, Mekong Region Future Institute</li> <li>• Dr. Sangam Shrestha, AIT, Associate Professor, Water Engineering and Management</li> <li>• Dr. Noah Kittner, The University of North Carolina</li> <li>• Mr. Suthy Heng, Regional Technical Advisor/Coordinator, Environmental Management Division, MRC</li> </ul> Concluding remarks: Dr. Kensuke Yamaguchi, Project Assistant Professor, U Tokyo

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# Presentation Schedule

DAY ONE: 27 November 2019

S1.1: 10:30 – 12:15	ENERGY 1	Richuliey
Session Chairperson: Dr. Nattadon Pannucharoenwong, Thammasat University, Thailand		Thailand
E-01	Solar cells energy consumption of automatic environment control system in the growth mushroom greenhouse <i>Nattadon Pannucharoenwong, Phadungsak Rattanadecho, Jarinee Jongpluempiti, Ponthep Vengsungnit, and Suankhaem Echaroj</i>	Thailand
E-03	An Intelligent Appliance Direct load control Classification for Residential Customer Demand Response Management <i>Nopporn Patcharaprakitti, Witoat Tippachorn, and Jeeratwan Saelao</i>	Thailand
E-04	Criteria for Evaluating the Health Index of Distribution Transformer in PEA <i>Pannathon Rodkummerd, and Komsan Hongesombut</i>	Thailand
E-05	Simulation of the appropriate capacity and mouthing position of distributed battery storage systems for maintaining the power quality in Maesiang Microgrid system, Thailand <i>Chaiyaporn Kaewvata, Chatchai Srisamphanwong and Trawat Srituwong</i>	Thailand
E-06	Biogas production of Water Hyacinth and Food Waste from Dry Co-digestion with Spay Inoculum System to Renewable Energy for the Community <i>Kodchasorn Hussaro, and Jutiporn Intanin</i>	Thailand
E-07	Economy-wide implications of household consumption on energy and CO2 emissions and its key influencing factors in Thailand <i>Onicha Meangbua</i>	Thailand
E-08	The biogas production of food waste and wastewater from Bang Ta Boon estuary, Phetchaburi Province <i>Jutiporn Intanin, and Kodchasorn Hussaro</i>	Thailand
E-09	Thermal Performance of Living Walls with Individual and Mixed Plant Species <i>Sasima Charoenki, and Suthat Yiemvattana</i>	Thailand
E-56	Optimal Microgrid Controller Design with Energy Storage Optimization Considering Renewable Energy Grid Integration <i>Praditpong Suksrithaomkul, Suttichai Premrudeepracharn, Tripong Kasirawat, and Rahul Metha</i>	Thailand



S1.2: ENVIRONMENT 1 & DEVELOPMENT 1

10:30 – 12:15

Session Chairperson: Mr. Cheriit Kalayanamitr, EGAT, Thailand

	Le Bistrot	
Env-01	Thailand	The Lesson Learn of the Implementation on Fire Hotspot Reduction in Chiangrai Province <i>Nopporn Patcharaprakitti, and Nion Sirimongkolrerkun</i>
Env-02	Thailand	Carbon Footprint of Black Soldier Fly Larvae from Organic Waste Treatment <i>Rathanit Sukhanapitrat, Samonporn Sutitibak, Ramin Sriyotha, Natapat Chansakathana, and Supawanee Kanjanakate</i>
Env-03	Japan	Pathways to Reducing Marine Plastic Pollution from Land-Based Sources in ASEAN Countries <i>Masasumi Ao</i>
Env-04	Thailand	Characterization of zeolite NaY loaded with K species and testing as catalysts for transesterification of refined Jatropha seed oil: Concerning Life Cycle Assessment and Environmental effects <i>Santipong Nuanual, Sawanee Manadee, Preecha Sriprapakhan, Surachai Arkla, Prapita Thanarak, and Pisit Maneechot</i>
Env-05	Thailand	Improving of the biogas quality via chemical adsorption of Sand-Ferric Oxide Composite: Imprementary to community - household uses <i>Preecha Sriprapakhan, Surachai Arkla, and Pisit Maneechot</i>
Env-08	Thailand	Coupling Flood Hazard with Vulnerability Map for Flood Risk Assessment: A Case Study of Nyaung-U Township in Myanmar <i>T.W. Khaing, S. Tantanee, W. Pratoomchai, and N. Mahanik</i>
Env-12	Thailand	Transesterification and characterization of <i>Boyyrococcus braunii</i> algae oil into Fatty Acid Methyl Ester (FAME) for biodiesel production <i>Johannex Fefeh Rushman, Pisit Maneechot, Dusit Buagate, Prapita Thanarak, and Anusorn Vorasingha</i>
Env-13	Thailand	Aging and Environment in Role of Rural Older Adults <i>Pawinee Iamtrakul, and Sararad Chaiyphong</i>
SD-42	Thailand	Flood Hazard Assessment based on Hydrologic and Spatial Modelling in Middle Chao Phraya River Basin, Thailand <i>Thanasit Promping, Vilas Nitvattananon, Oleg V. Shipin, and Sutinee Chao-amornpiat</i>
S2.1:	<b>ENERGY 2</b>	
13:00 – 15:30	<b>Richulieu</b>	
Session Chairperson: Asst. Prof. Dr. Boonruang Marungsri, Suranaree University of Technology, Thailand		
E-10	Thailand	Photovoltaic (PV) Module Sizing of a PV-Cascade Heat Pump for Simultaneous Hot Water Heating and Building Cooling in Tropical Climate <i>Rithy Kong, Attakorn Asanakharn, Thoranis Deethayaj, and Tanongkiat Kiatsiriroat</i>
E-11	Thailand	MEA'GIS vs Solar Rooftop <i>Punnapas Apakittikun</i>
E-12	Thailand	Hydropower Cooperation for Firm Power Production of Hydropower Plants System in Central 1 Region of Laos People's Democratic Republic <i>Leechuefue Sayaxang, S.Premrudeeprachacharn, and K. Ngamsanrooj</i>
E-13	Japan	The possibility of distributed renewable energy sources for trust building in Myanmar <i>Masako Numata, Masahiro Sugiyama, and Gento Mogi</i>
E-14	Thailand	A Solar Home Battery Energy Storage for Demand response Management <i>Jutitrit Thongporn, Worrajak Muengjai, Teerasak Somsak, and Nopporn Patcharaprakitti</i>
E-15	Thailand	Quantifying Greenhouse Gas Emissions from the Port <i>Supawat Chaikasem, and Veerapas Na Roi-et</i>
E-16	Thailand	Conceptual Study of Community Peer-to-Peer energy trading in Thailand <i>Ashok Paudel, and Boonruang Marungsri</i>
E-17	Thailand	Optimal Location and Capacity of DG in Micro-grid by Application of Electrical Power Forecasting <i>Richard Joseph Mushi, and Boonruang Marungsri</i>
E-18	Thailand	Development of Wide-Area Protection and Coordination for Electrical Transmission Systems with Distributed Generation <i>Autthaporn Supannon, Suttichai Premrudeeprachacharn, and Piyadana Pachanapan</i>
E-20	Thailand	The Long Short-Term Memory for Prediction the Lifetime of the Distribution Transformer <i>Wuthichai Man-im, and Suttichai Premrudeeprachacharn</i>
E-21	Thailand	Experimental Study of PV Panel Cleaning in Solar PV Farm of Rainy Season of Thailand <i>Nirutti Nilkeaw, Kitiwat Chimabutr, Chairat Sornchai, Boonyang Plungklang, Krischonne Bhumkittipich, Yuttana Kongjeen, Krittidet Buayai, and Kaan Kerdchuen</i>
E-65	Thailand	AHP for Prioritizing the Competitiveness Factors in Agro-Industry Supply Chain: A case of The Lower Northern of Thailand <i>Chakthong Thongchatit, Panu Buranajarukorn, and Asawin Pasutham</i>
E-68	Thailand	Factors Influencing Intention to Use Solar Rooftop Energy of Households in Thailand <i>Pongsapat Thepprattuangthip, and Nuttawat Rojnitruittikul</i>
E-69	Thailand	Speed Control for Induction Machine using Fuzzy Logic Controller by Considering Power Loss Optimization <i>Anant Onsvitilai, Apichai Rojwongviriyai, and Ratchadaporn Onsvitilai</i>

ENVIRONMENT 2 & DEVELOPMENT 2		Le Bistrot
S2.2: 13:00 - 15:30		
Session Chairperson: Dr. Rikke Lybæk, Roskilde University, Denmark		
Env-14	Healthy Aging in Home Environment Exposures <i>Pawinee Iamtrakul, and Sararat Chuaphong</i>	Thailand
SD-01	The Study and Development of Cultural Resources Tourism Route along the Bang Khen Canal Bangkok <i>Piyaporn Thacheen, Supanee Pladsrichaiy, Nattadon Pannucharoenwong, and Wachirathorn Janchomphiu</i>	Thailand
SD-02	Effects Of Persistent Highly Humid Conditions On PV Modules: A Case Study After Prolonged Heavy Rains In Thailand <i>Nipon Ketjoy</i>	Thailand
SD-04	The Effect of Rubber Roller Husker Motor Speed on the Separation of the Husk From the Popped Rice <i>Nattadon Pannucharoenwong, Phadungsak Rattianadecho<sup>1</sup>, Jarinee Jongpluempiti<sup>2</sup>, Ponthep Vengsungnit<sup>2</sup> and Snuankhaem Echaroj</i>	Thailand
SD-07	Policy review and Framework conditions for deploying 'Industrial Symbiosis' - What are the obstacles & drivers and future way forward? <i>Rikke Lybæk, Thomas Budde Christensen<sup>2</sup> and Tobias Pape Thomsen</i>	Denmark
SD-08	China's rising in GMS and Its Impact on Geopolitical and Geo-economics <i>Pittaya Suwakunta</i>	Thailand
SD-09	Modelling land evaluation using an integrated Geographic Information System and Multi-Criteria Decision Analysis (GIS-MCDA) based on fuzzy logic: A case study for identifying suitable sites for human rehabilitation in Southern Bhutan <i>Chokila, and Kampanart Piyathamrongchai</i>	Thailand
S3.1: 15:45 - 18:15		
Session Chairperson: Asst. Prof. Dr. Piyadanaei Pachanapan, Naresuan University, Thailand		
E-23	Optimal Substation Placement for Microgrid Power System Based on Nearly Positioning of Bus on the Free Space Area <i>Annart Puritaisophol, Yuttana Kongjeen, Nirutti Nilkeaw, Chairat Sornchai, Boonyang Plangklang, Krischonme Bhumkitipich, Krittidet Buayai and Kaan Kerdchuen</i>	Thailand
E-24	Impact of Voltage Unbalance to Modern Microgrid System under High Penetration of Fast Charging Station <i>Noppanut Chigreeyan, Yuttana Kongjeen, Nirutti Nilkeaw, Chairat Sornchai, Boonyang Plangklang, Krischonme Bhumkitipich, Krittidet Buayai, and Kaan Kerdchuen</i>	Thailand
E-26	Implementation of Single Phase Grid-Tied Inverter with Voltage Controller for Preventing Over-voltage Problem in	Thailand
ENERGY 3		
Distribution Networks with solar PV rooftops <i>Piyadanaei Pachanapan, Apirak Tadhip, and Sakda Somkun</i>		
E-31	A mathematical modeling for electrical load profiles of Thailand's Residential Customer <i>Nopporn Patcharaprakitti, Wisut Tippachorn, and Jeeratwan Saetiao</i>	Thailand
E-33	An Investigation on Total Power Losses of a Large Scale PV Power Plant <i>Rungphet Kongnok, Nirutti Nilkeaw, Chairat Sornchai, and Boonyang Plangklang</i>	Thailand
E-36	Optimization of Home Photovoltaic Battery System for Direct Load Control Demand Response Program <i>Wisut Tippachorn, Anon Namin and Nopporn Patcharaprakitti</i>	Thailand
E-38	An Energy Flow Control from Electric Vehicle Battery to grid (V2G) and Home Battery of residential customer for Demand Response Management <i>Anon Namin, Kosol Oranpiroj, and Nopporn Patcharaprakitti</i>	Thailand
E-70	Identifying the Parameters of a Permanent Magnet Synchronous Machine using Moth Flame Optimization <i>Ratchadaporn Oonstitai, Apichai Rojwongviriya, and Anant Oonstitai</i>	Thailand
DEVELOPMENT 3		
S3.2: 15:45 - 18:15		
Session Chairperson: Assoc. Prof. Dr. Pensri Jaroenwanit, Khon Kaen University, Thailand		
SD-10	River Flood modeling of Amochu River using GIS and HECRAS: A case study in Phumtholing city, Chukha, Bhutan <i>Kinley Dorji, Sittichai Choosumrong<sup>2</sup> and Tanyaluk Chansombat</i>	Thailand
SD-11	Urban growth simulation using Remote sensing, GIS, and SLEUTH urban growth model: a case study under Sarpang District, Bhutan <i>Lobzang Tobgye, and Kampanart Piyathamrongchai</i>	Thailand
SD-12	Multi-criteria evaluation approach to GIS-based land suitability for sugarcane planting area in Phitsanulok Province, Thailand <i>Sittichai Choosumrong, Thanatsan Poompaiboonpipat, Tenzin Wangchuk, Rapikorn Chalongsuppanyoo, and Venkatesh Raghuvaran</i>	Thailand
SD-13	Implementation of an optimal routing system service based on Web Map Application using FOSS4G and Open Data <i>Tenzin Wangchuk, and Sittichai Choosumrong</i>	Thailand
SD-14	Impact of climate change on distribution probability of wild boar ( <i>Sus scrofa</i> ) in Bhutan using Maximum Entropy Model (MaxEnt) <i>Thinley Tshering, Pathana Rachawong, and Tanyaluk Chansombat</i>	Thailand



SD-33	<i>Mullika Jumpang</i> Application of WEAP for the Evaluation of Surface Hydrology in the Bago River Basin, Myanmar <i>Hnin Thidar Phuc, Sombat Chuenchooklin, and Puripus Sonthormond</i>	Thailand	E-82	<i>and Jirawan KLAYLEE</i> Prediction of energy building using artificial neural networks	Thailand
SD-34	Winged bean seed oil preparation and dietary supplement development from winged bean seed, pomegranate seed and moringa oleifera seed oil mixture <i>Ratchadaporn Oonsivilai, Thidarat Ananthasiri, Nipaporn Pomloy, and Anant Oonstollai</i>	Thailand	E-83	<i>Narut Butploy, Kanokwan Khiewuan, and Pakin Maneechot</i> Optimal Planning for Shared Battery Energy Storage System among Residential Consumers	Thailand
SD-35	A Study of Problems of SME Development: A Case Study of Banana Processing Industries in Thailand's Lower Northern Region <i>Panu Buranjarakorn, Kumpon Subsomboon, Charatdao Kongmuang and Pinitch Booniam</i>	Thailand	E-90	<i>Veeradech Sirariyaporn, and Krishida Srirachiyom</i> Optimal Sizing and Allocation of Battery Energy Storage System Integrated in Distribution Using Particle Swarm Optimization	Thailand
SD-36	The Social capital factors influencing are participation in Ecotourism management of Ban Ko Rat Community, Don Sak district, Surat Thani province <i>Natcharee Thaveehirunratthakid</i>	Thailand	E-91	<i>Prakasit Prabpai, Yuttana Kongjeen, and Krischomme Bhumkitipich</i> Electricity rate calculation of Battery bank management for distribution retail at energy park KamphaengPhetRajabhat University	Thailand
SD-48	An Investigation of Thai Thermal Comfort Model with Gender, Weight and Age Differences in Royal Thai Buddhist Architecture: Wat Bowon Niwet Wihan <i>Sasitorn Srijuengfong</i>	Thailand	E-85	<i>Nitadee Klungsida, Watchara Wongpanyo, and Buriyawat Vichanpol</i> Design of Phase-Shifted Full Bridge Power Converter for Photovoltaic Application	Thailand
S5.1: 10:30 - 12:15	ENERGY 5	Richulieu	E-87	<i>Wasan Phetphimoon, and Krischomme Bhumkitipich</i> Design of 115/22 kV Power Transformer Trip Event and Load Transfer using Fault Tree Analysis and Smooth Holtz-Winter	Thailand
Session Chairperson: Assoc. Prof. Dr. Pawinee Iamtrakul, Thammasat University, Thailand			S5.2: 10:30 - 12:15	<i>Radomboon Taksana, and Krischomme Bhumkitipich</i>	Le Bistrot
E-51	The Study of Power System State Estimation in PEA Transmission Network <i>Dolprapap Kammertsiri, and Weerawoot Kanokbannakorn</i>	Thailand	Session Chairperson: Assoc. Prof. Dr. Suwit Kiravittaya, Naresuan University, Thailand	DEVELOPMENT 5	Thailand
E-52	New Business Opportunity for Thailand Demand Response of Utility <i>Parinya Sonsaard, and Nipon Keijoy</i>	Thailand	SD-29	<i>Maize Health Monitoring by UAV Technology</i> <i>Wanwisa Pimsak, Sittichai Choosumrong, and Suwit Kiravittaya</i>	Thailand
E-53	Minimizing Power Loss In The Grid Using Improved Moth-Flame Optimization Method <i>Qui Bui Lam, and Khai Phuc Nguyen</i>	Vietnam	SD-37	Sustaining new technology-based firms' growth in the Greater Mekong Subregion (GMS) - a technology incubation intervention <i>Anurak Birnui</i>	Thailand
E-55	Prioritization of Maintenance Tasks on Electrical Distribution Systems Using RCM method and Criticality Factors <i>N. Duangta, N. Teera-achariyakul, and D. Rerkpreedapong</i>	Thailand	SD-38	Technology Aspects of Living with Disabilities in Thailand and Austria <i>Keowlin Angkananon, and Chumphon Kaewsom</i>	Thailand
E-58	Travel Demand Analysis for Electric Trolley Bus in Pattaya City, Chonburi, Thailand <i>Pawinee Iamtrakul, Jirawan Klaylee, and I-soon Raungratanaamporn</i>	Thailand	SD-39	Knowledge Transference and Cultural Reinvention in Cambodia's Post-Khmer Rouge: A Case Study of the Improvisation of Present Cambodian Fortune-telling Practice <i>Poonnatree Jivariyaboonyia</i>	Thailand
E-59	Mobility Improvement for Paratransit Services in Tourist City: Case Study Phattaya Municipality, Chonburi Province, Thailand <i>I-soon RAUNGGRATANAAMPORN, Pawinee IAMTRAKUL,</i>	Thailand	SD-45	Analysis of Land Use Change and Urban Growth Related to Natural and Anthropogenic Hazards: Case of Chao Phraya River Basin, Thailand <i>Napassorn Suttthiprapa, Vilas Nitivatannanon, Saranuat</i>	Thailand

## Energy

SD-46	Ninsawat, Yada Sukonthaphan <sup>1</sup> , and Lilai Xu Municipal Solid Waste Management for Coastal Tourism Destinations in Eastern Thailand: Challenges and Opportunities	Thailand
SD-47	Surasak Jotaworn, and Vilas Nitivatitananon Debt and Survival of Rubber Farmers in Surathani	Thailand
SD-48	Phaisarn Narkgrai An Investigation of Thai Thermal Comfort Model with Gender, Weight and Age Differences in Royal Thai Buddhist Architecture: Wat Bowon Niwet Wihan	Thailand
S6: 13:30 - 16:30	<b>ENERGY 6</b>	<b>Le Bistrot</b>
E-57	Session Chairperson: Dr. Nattadon Pannucharoenwong, Thammasat University, Thailand Optimal Placement of Solar Farm and EV-Charging Station using Metaheuristic Optimization Technique K. Yenchamchalit, K. Bhumkittipich, Y. Kongjeen, K. Buayai, and K. Kerdlueen	Thailand
E-88	Voltage based Non-Standard Inverse Time Characteristic for Over Current Relay in Distribution System connected DFIG-based Wind Turbines	Thailand
E-89	Nattapol Ha-upala, and Krischonme Bhumkittipich Load Frequency Control in Two-Area Interconnected Power System under Solar Farm Installation	Thailand
E-84	Sontaya Manmai, and Krischonme Bhumkittipich Application of Multi-Verse Optimizer for Optimal Placement and Size of Distributed Generation in Radial Distribution Networks	Thailand
E-75	Dusit Uthitsunthorn, Sowan Ang, Suphatchakan Niachkum, and Uthien Leeton The analysis framework for high penetration PV rooftop in LV distribution network: case study	Thailand
E-76	Provincial Electricity Authority Paiwach Kitvoravit, and Nipon Kejoy Development of an Automated Building Energy Management System with IoT (aBEMS-IoT) for Supporting the Demand Response	Thailand
E-81	Nitchakul Intem, Chatchai Sirisampunwong, and Nipon Kejoy Transmission System Expansion Planning in Consideration of Reliability Criteria and Optimal Reserve	Vietnam
	Tran Huu Trinh, Vo Ngoc Dieu, and Quyen Huy Anh	

### E-01: Solar Cells Energy Consumption of Automatic Environment Control System in the Growth Mushroom Greenhouse

Nattadon Pannucharoenwong<sup>1</sup>, Phadungsak Rattanadecho<sup>1</sup>, Jarinee Jongluemphitt<sup>2</sup>, Ponthiep Vengsunglue<sup>2</sup> and Sruinkhaem Echaroj<sup>1</sup>  
<sup>1</sup>Department of Mechanical Engineering, Thammasat School of Engineering, Thammasat University, 12120, Thailand.  
<sup>2</sup>Department of Agricultural Machinery Engineering, Faculty of Engineering and Architecture, Rajamangala University of Technology Isan, Nakhon Ratchasima, 30000, Thailand

Agricultural development has been found to give the Greater Mekong Subregion (GMS) a competitive advantage over other region. Due to recent intensive urbanization of the GMS it is important to design an appropriate source of energy that is both available in the area and environmental friendly. Implementation of solar cells technology can have a promising effect on the growth of the scientific communities. This article aims to record data and analysis energy consumption of an automatic environment control system in mushroom greenhouses using energy sources from solar cells cooperate with typical source. Inside the greenhouse was installed sensor there were used to measure temperature, humidity and carbon dioxide content for control the water pump and fan to work with specified conditions. The experiment results shown if using algorithms 1, 2 and 3, the system uses energy in the system equal to  $331.88 \pm 3.72$ ,  $333.09 \pm 2.55$  and  $343.51 \pm 1.62$  wh/day respectively. Average solar energy in each day will have electricity between 3,149.32 - 4,420.10 wh/day. Therefore, it is possible that the energy system from solar cells cooperate with electricity from the typical energy mushroom growing greenhouse. The designed solar-based technology can be adopted in many area of the GMS with similar solar intensity profile.

### E-03: An Intelligent Appliance Direct load control Classification for Residential Customer Demand Response Management

Nopporn Patcharaprakiti, Worrajak Muengjai and Jeerawan Sae-lao  
 Department of electrical engineering, Rajamangala University of Technology Lanra Chiang Rai, 99 Sai Khao, Pan, Chiang Rai, Thailand, 57120, (corresponding author) e-mail: pnopporn@rmu.ac.th

This paper proposes the technical of household appliance load design for demand response management with direct load technique. The appliance is divided into 2 groups follow as sheddable load sensitive load. The sheddable load is deferrable load which can de-energies power in duration of demand response program by using direct load control. The sensitive load is significant load which cannot be interrupted. When the demand response program is operated by de-energy energy to the household then the energy from battery or solar is used to supply this sensitive load. The load classification, communication, data acquisition and monitoring via IOT and openADR are designed to support demand side management with demand response. The experimental is performed to verify the concept and result are satisfied.

addition, should consider about community participation in the Illuminated Boat Festival because without local people, the uniqueness culture of Nakhon Phanom Province would not be existed, and they would not reach the sustainable tourism goal.

**SD-24:**

### **The Utilization of Plants: A Case Study of Community Forest in Pattanajit Temple, Na Nai Sub-district, Phonsawan District, Nakhon Phanom Province**

*Pornpimpon Kawansu, Chanida Yubonsai, Chianaporn Kaensa, and Kariyaya Mikama*  
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Muang, Nakhon Phanom 48000, Thailand. (corresponding author to provide phone: 66-8-97157632; Fax: 66-4-258-7290; e-mail: pornpimpon.kawan@gmail.com)

The objective of this research was to study the utilization of plants in community forest located Na Nai Sub-district, Phonsawan District, Nakhon Phanom Province regarding Plant Genetic Conservation Project under the Royal initiative of Her Royal Highness Princess Maha Chakri Sirindhorn (RSPG). In this study, the researchers used a qualitative method with interview by focus group and brainstorming comprised of 32 people consisting of local philosophers, community leaders, administrative organization government officials and local people who utilized the community forest. The data were analyzed using content analysis. The results showed that more than 50 different varieties of plants were commonly utilized by local people which classified into 4 types, depending on plant utilization. All plants included 1) edible plants which were categorized into 8 varieties of wild mushroom, 12 varieties of local vegetable and 11 varieties of local fruit 2) 22 varieties of medicinal plant 3) 1 variety of beliefs and rites plant and 4) 6 varieties of timber. Moreover, the results found that the plants were mainly used in support life more than commercial utilization. Some of seasonal plants especially mushroom, gathered and utilized, were sold in order to earn extra income. The conclusion of community forest management by community participation were summarized that 1) stake holder should set the rules and regulations together for utilization of the community forest 2) rarely valuable plants should be conserved and reproduced for commercial 3) administrative organization government officers, university and local researcher should conducting research on rarely valuable and medical plants 4) wisdom knowledge of using plant medicinal should be transferred to the next generation of community people. 5) government sector and public sector should set learning center for forest management and conservation.

**SD-26:**

### **Social Innovation: Improving the Learning Ability about Renewable Energy in the 21st Century by a Process of Creative Drama**

*Pinnapat Bhumkittipich, Nuttakit Iamsomborn, Wanjai Lamprorn and Nisakorn Singhasene*

Department of Social Sciences and Humanities, Faculty of Liberal Arts, Rajamangala University of Technology Thanyaburi, Thailand, (corresponding author to provide email: Pinnapat\_j@rmutt.ac.th)

This article aims to study the societal environment at Wat Koke Gate (Serm Som Boon Wong) School; to provide help and suggestions on how to apply social innovation to improve the ability in learning about renewable energy in the 21st century. There were 18 samples in this study. The data was collected through in-depth, combined with

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were 100 members from different families and they collaborated on mat weaving by dividing the work according to specific expertise. Group leaders encouraged and supported members to participate in group and implemented plans to develop community enterprise. The raw materials of mat, reeds, were planted in the local area which reduced costs and enhanced quality of products. The guidelines for the development of community enterprise were 1) creating an identity of specific-owned local products 2) developing product design and utilization, and 3) inheriting or training in production for conservation to the next generation.

**SD-22:**

### **English Development for Youth Local Tour Guide using Thai So Culture and Authentic Materials in ELT**

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This study aims to develop English for youth local tour guide based on cultures and authentic materials in Ban Phon Chan School, Nakhon Phanom Province. These students are ethnic locals who live in Thai So community, Phon Sawan District, Nakhon Phanom Province, Thailand. They speak Thai So dialect and surrounded by unique culture and way of life. In their community, there are tourist attractions which display the uniqueness of people who live there. Developing English using culture and authentic materials in teaching English for youth tour guides will help boost the local tourism. In addition, assisting students as youth tour guide is the advantage for them and also the community. In the training project, culture and authentic materials were implemented in English learning. Students had opportunity to apply English language through their cultures and local materials. For the results from pretest and posttest, students who attended English development for youth local tour guide project are able to develop their English learning through using cultures which is statistically significant ( $p < .01$ ). They are able to develop their learning through authentic materials; they should be able to practice in the authentic situations and spend more time on practicing with foreigners.

**SD-23:**

### **The Factors of Community Participation in Tourism, a Case study of the Illuminated Boat Festival, Nakhon Phanom Province, Thailand**

*Prompassorn C.*  
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The objective of this study is to investigate the factors that encourage the community participation in tourism in Nakhon Phanom province through Illuminated Boat Festival. The study conducted in-depth interviews with 5 key informants for qualitative method and quantitative surveys with 296 samplings in two phases over a period of 2 months. The research found that income and knowledge are that significant factors influence community participation in Illuminated Boat Festival contribute to sustainable tourism in Nakhon Phanom province. The finding suggests that the policy maker would engage with raising knowledge about the important of the festival. In

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