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From the Director

On 24 February, JGSEE established formal linkage with Kyoto University, ushering in a new era of technical cooperation with international institutions.

As some of our readers may be already aware, Kyoto University, led by its Graduate School of Energy Science, the Institute of Advanced Energy at the Radio Science Center for Space and Atmosphere, recently won substantial Japanese Government funding to establish a Center of Excellence (COE) on Sustainable Energy System under the 21st Century COE Program. The ultimate goal of the COE is to establish a sustainable energy system that would guarantee energy security for Japan and would facilitate the realization of an environmentally friendly society. This COE program is focused on education and research in four core areas: (1) solar energy, (2) hydrogen energy, (3) bioenergy systems, with (4) evaluation of the energy systems. International PhD programs on total energy science are also to be established. To promote the establishment of the 21 COE, an organization named "International Sustainable Energy Information Center (ISEIC)" has been set up as a supporting center of research and education. The Center's roles include, among others, the collection, analysis and presentation of various kinds of energy and environmental data, and the promotion of world-wide research collaboration. One such center was launched in Bangkok in November 2003 with the assistance of Rajamangala Institute of Technology, with whom Kyoto University has had a close cooperation for some time. Following a recent visit to KMUTT of Prof. Susumu Yoshikawa, the Director of the ISEIC,

I was invited to participate and deliver congratulatory remarks at the launching of the Center. A series of discussions then ensued and culminated in the signing of a Memorandum of Understanding (MOU) in Kyoto with myself, representing JGSEE on the one part, and Professor Mikio Kasahara, Dean of the Graduate School of Energy Science and COE Project Leader, and Prof. Yoshikawa on the other part.



Front row (from left to right): Dr. Bundit Fungtammsan, President Oike of Kyoto University, President Namyuth Songthanapitak of RIT and Prof. Yoshikawa

The MOU seeks to promote mutual cooperation on education and scientific research. Already, plans for cooperative activities have been worked out. For example, during 19-23 July 2004, a joint presentation of thesis progress by PhD candidates of both institutions will be organized in Bangkok, and a Joint International Conference incorporating JGSEE's 3rd Regional Conference on Energy Technology towards a Clean Environment (RCETCE) and the 21 COE's International Symposium of Sustainable Energy Systems, will be held

in Cha-um during 1-3 December 2004. The theme of this conference is "Sustainable Energy and Environment (SEE)" (www.jgsee.kmutt.ac.th/see). Joint research activities are also being explored.

The connection with Kyoto University bodes well for JGSEE not only because of the widely publicized "Kyoto Protocol", but also because Kyoto University, being the top university in Asia, is highly recognized for its excellence in energy and environmental sciences. While paying a courtesy call to President Kazuo Oike, I was reminded that Kyoto University was founded in 1897, and that five out of the seven Japanese Nobel Prize winners were from this University. I hope this MOU will lead to fruitful cooperation with Kyoto for JGSEE and the consortium partners.

Bundit Fungtammasan

JGSEE Annual Seminar and R&D Roadmap Revisited

Following the recommendation of the Technical Expert Group (TEG) Annual Review early last year, an R&D Roadmap for selected technical areas was developed by JGSEE's core staff and their affiliates from the consortium partners in June. The Roadmap served as a guideline for directing future research of JGSEE into areas that are critical for research capacity building and that best serve the needs of industry. It has also been used as a basis for resource allocation and as a platform upon which collaborative research teams and projects are developed.



However, in the light of recent developments in our national energy policies and strategies, which are widely believed to have far-reaching consequences on Thailand's energy and related environmental landscape, the management of JGSEE thought it appropriate and timely to have the roadmap revised to follow more closely the perceived needs. To this end, the JGSEE's annual seminar entitled "JGSEE's R&D Roadmap: Towards Collaborative Research and Technology Self-reliance" was held during 30 January – 1 February 2004. A total of 34 academic staff and 25 supporting staff converged at Home Phu Toey Resort in Kanchanaburi for the weekend retreat. While the academic staff consolidated their research efforts and mapped out their plans, the supporting staff deliberated on ways and means to enhance their performance through improved "workflow". On this occasion, Professor Naksitte Coovattanachai, Chairman of the Professorial Board and Director of RGJ PhD Program, gave a talk on "The Government's New Energy Strategies: Opportunities for Technology Innovation and Technological Self-Reliance", Professor Chongrak Polprasert, a member of the Professorial Board and Dean of the School of Environment, Resources and Development at the Asian Institute of Technology, on "Asian Environmental Challenges and a Roadmap towards Environmental Sustainability", Dr. David Minns, Special Advisor to Sustainable Development Technology, National Research Council Canada, on "Why an R&D Roadmap: Researchers and Laboratories' Perspective" and Dr. Udomkiat Nontakaew, affiliated staff from KMITNB and TRF Industrial Research Support Coordinator, on "Technological Self-Reliance and Research Collaboration in the Context of Thai Industry: A Personal Experience".

ADB Loan Review Mission

During 11-18 December 2003, the Asian Development Bank (ADB), fielded a Mission to Bangkok to review all aspects of the activities of the Higher Education Development Project (HEDP), of which JGSEE is a subproject implementation unit (SPIU).

The Mission, led by Mr. Yasushi Hiroto, Senior Education Specialist, assessed that "the development outputs of the HEDP are emerging, although the development impacts need to be documented in due course of the project implementation for the remaining project period, which is proposed to be extended by one year until 31 March 2006. The Mission "is confident that the project performance including contract awards and disbursements will be greatly improved during the remaining project period", and that the HEDP goal and objectives will be fully met by achieving both the quantitative and qualitative targets ...".

Prof. Somchart Soponronnarit Wins UNESCO Recognition

JGSEE would like to congratulate Prof. Dr. Somchart Soponronnarit, one of the JGSEE founders and a member of our Professorial Board, on his UNESCO Science Prize 2003 in the research field of renewable energy, particularly drying process technology. The award ceremony, which has been arranged every two years by United Nations Educational, Scientific and Cultural Organization (UNESCO), was held on 10 November 2003 in Budapest, Hungary. This prize, one among four UNESCO awards, is generally presented to an outstanding researcher in the field of Science and Technology or in the field of Engineering and Industrial Development.

School Secretary Awarded Law Degree

JGSEE would also like to congratulate Ms. Chanida Wongchanglor, the JGSEE School Secretary, as she adds an L.L.B. from Thammasart University to her repertoire of degrees, which include an MBA in International Banking and Finance from the University of Thai Chamber of Commerce and University of Birmingham, UK, a certificate of International Trading

and Arbitration from ThaiBar, Thailand, and a BA in Political Science from Ramkhamhaeng University.

New Projects

Kyoto Protocol and Integrated Product Policy

Trade and environment have become important global issues. Recently, Thailand Research Fund (TRF) assigned the Joint Graduate School of Energy and Environment, led by Assoc. Prof. Dr. Sirintornthep Towprayoon to research into the "**Impact of International Convention and Measures related to the reduction of Greenhouse Gases on Trade and Environment**". The project is one component in the TRF project theme of **trade and environment** aiming to prepare for the readiness of trade and environment and to improve basic knowledge at the national level as well as policy and measures recommendation. The project will also provide the platform for discussion and information exchange as well as tracking the current global situation on the greenhouse gas emissions and carbon credit with dynamic homepage to be linked with other groups. Not only JGSEE and SIIT-TU, but competent researchers from Mahidol University and Chulalongkorn University have also been invited to contribute to the project.

Impacts of the Small Distributed Electricity Generators on the Electricity Distribution Grid

In order to promote the use of renewable energy and the very small power producers, the connection to the distribution grid is required. The study will identify barriers and values for the small distributed generators from renewable energy connecting to the distribution grid. The project, which is financially supported by the Knowledge Network Institute of Thailand (KNIT), studies the impacts of the small distributed generators in the aspects of technical requirements, social and

environmental barriers, and business viability. JGSEE's Dr. Athikom Bangwivat is the Principal Investigator (PI), the co-PI's being Asst. Prof. Chumnong Sorapipatana and Dr. Shabbir H. Gheewala of JGSEE, Assoc. Prof. Worawit Tayati of Chiang Mai University, and Assoc. Prof. Bundhit Eua-arporn of Chulalongkorn University.

Biogas Roadmap

On 23 January 2004, JGSEE with the supervision of Dr. David Minns, Special Advisor to Sustainable Development Technology, National Research Council Canada and visiting professor of JGSEE, in cooperation National Center of Genetics Engineering and Biotechnology of Thailand, organized the meeting of biogas stakeholders in the industrial, municipal solid waste, agricultural as well as electricity generation sectors to brainstorm on the biogas technology development roadmap using SWOT analysis as the tool. The meeting was part of the collaboration of BIOTEC and HEDP - Commission of Higher Education (CHE) at Ministry of Education under the MOU of the two organizations.

Renewable Energy Roadmap

Since last October, JGSEE, with the collaboration of affiliated staff from its consortium partners, has undertaken a project to develop an R&D Roadmap on Renewable Energy for DEDE (Department of Alternative Energy Development and Efficiency). The main purpose of the roadmap is to provide direction and guidance for future R&D efforts in Thailand so that they may contribute effectively to the realization of the Government's goal in the promotion of the use of renewables. As part of the national strategies on energy for competitiveness, the Government is committed to step up the share of renewables from 0.5 % to 8% of the total energy use in 8 years. The potential renewables include biomass, wastes, small hydro, solar and wind.

Workshops and Seminars

NOx Emission and Control and Filtering Combustion

This lecture, held on 19 February 2004 at KMITNB, was co-organized by JGSEE and the Waste Incineration Research Center, KMITNB. The two topics presented were (1) NOx Emission and Control: Fundamentals and Practical Examples and (2) Filtering Combustion or Smoldering, Combustion in Porous Media, Super-adiabatic Combustion. Dr. Pierre Joulain, visiting professor at JGSEE delivered the talks. Prof. Joulain has been a first-class research scientist at the Centre Nationale de Recherche Scientifique (CNRS) since 1994. His research work covers combustion of solid fuels and solid waste, solid propellants, combustion of gaseous fuels, turbulent and micro-gravity combustion, fire dynamics and fire safety science.



Workshop on Gas Chromatograph-Electron Capture Detector (GC-ECD) for measuring N_2O emission from terrestrial ecosystem

This workshop was organized by the Environmental Division of the JGSEE, with collaboration of Bara Scientific Co., Ltd. and Prof. Shigeto Sudo from National Institute for Agro-Environmental Science (NIAES), Tsukuba, Lapan, during February 16-17, 2004 at JGSEE.

About 30 participants from various organizations attended this workshop. The first day focused on lectures of basic science for gas chromatography (GC), principle of electron capture device (ECD) and its applications, trouble shooting and N_2O sampling technique. The second day focused on hands-on training of how to operate GC-ECD from the beginning and calculate N_2O flux. Participants had a chance to collect gas samples by themselves using the close chamber techniques. Subsequently, from the concentration they calculated the N_2O flux.



The Development and Use of Biodiesel in Germany

This seminar, presented by Prof. Dr. rer. nat. Bernd Stephan, was organized by JGSEE in collaboration with Department of Chemical Engineering, Faculty of Engineering, King Mongkut's Institute of Technology North Bangkok and The Association of Former Thai Students in Germany under the Royal Patronage. It was held at the Thai-German Cultural Foundation in Bangkok on 11 February 2004. Prof. Stephan teaches Physical Chemistry at the University of Applied Sciences, Hochschule Bremerhaven, Germany. His research work focuses on biogas technology, wastewater treatment, recycling processes, and more recently in the chemistry of biodiesel production.

The lecture was focused on biomass conversion: vegetable oils and fats (e.g. palm oil) as the basis of

biodiesel production. The chemical-technical process and the properties of the products for application were described.



The Situation and Trends on Renewable Energy in Germany

This seminar, second in a series of two seminars presented by Prof. Dr. rer. nat. Bernd Stephan, was organized by JGSEE in collaboration with EGAT and held at EGAT Head Office on 12 February 2004. Prof. Stephan started with a brief talk on the situation of energy resources and their utilization today and in future, as also options to deal with the expected energy shortage. The utilization of renewables in Germany today and future trends were also discussed. The lecture was focused on power generation by biomass and wind energy. The situation of the German electricity market and its future options as well as possibilities and chances for Thailand were demonstrated.

Assessment Tools for Technology Improvement and Sustainable Design

A one-day workshop on the above topic was co-organized by JGSEE and the Chemical Engineering Department, KMUTT, on 29 January 2004. The workshop was conducted by Dr. David Minns, Special Advisor to

Sustainable Development Technology, National Research Council Canada and Visiting Professor of JGSEE, and Dr. Shabbir H. Gheewala of JGSEE. It was designed to introduce the philosophy of life cycle thinking. A number of tools for sustainability assessment in product/process design were introduced. Cases were also shown to illustrate how these tools could lead to technology improvement and sustainable design. The workshop was attended by about 50 participants.



Workshop on Constructed Wetlands for Wastewater Treatment

Constructed or artificial wetlands are an emerging ecotechnological treatment system, which are designed to overcome the disadvantages of natural wetland systems, but possess the positive attributes of a natural wetland. The use of Constructed Wetlands for wastewater treatment in Asia is currently being recommended as a low cost and sustainable environmental technology. The high ambient temperatures and rainfall in tropical countries are ideal for plant and microbial growth and constructed wetlands are appropriate for use in small communities. Although they are simple to construct, their operation and maintenance requires trained personnel to ensure that they function efficiently. Thus, a workshop was organized to introduce the operating principles, design, vegetation selection and

management, vector control and other operational and maintenance requirements of the constructed wetlands.

The workshop was co-organized by the Dept. of Environmental Engineering, Chiang Mai University and Dept. of Civil Engineering, Prince of Songkhla University in Had Yai and supported by JGSEE programme. It was held during 8-9 December 2003 in Chiang Mai.

Professor Brian Shutes from Middlesex University, London, UK, was the invited speaker. He is Vice-Chair of the International Water Association (IWA) Specialist Group on the use of Macrophytes for Water Pollution Control. The co-lecturers for the workshop were Assoc. Prof. Dr. Suwasa Kantawanichkul and Assoc. Prof. Dr. Seni Karnchanawong from the Dept. of Environmental Engineering, Chiang Mai University, and Asst. Prof. Dr. Udampol Puetpaiboon from the Dept. of Civil Engineering, Prince of Songkhla University.



JGSEE staff attends Training Workshop on LCA and Ecodesign in Japan

A training workshop on Advanced Life Cycle Assessment (LCA) and Ecodesign was held in Japan during 8 – 20 December 2003. This workshop was part of the Green Aid Plan under the New Energy and Industrial Technology Development Organization Program on

Industry and Environmental Protection for Thailand (NETH), funded by the Association for Overseas Technical Scholarship (AOTS), Japan. It was attended by 30 participants from Thailand's research institutes, industry, government and academia. The objective of the workshop was to introduce the concepts of LCA and Ecodesign and also introduce the Japanese experience in recycling programs and environmental labeling. JGSEE was represented at this training workshop by Dr. Shabbir H. Gheewala, who teaches Waste Minimization and LCA, and supervises graduate research in integrated environmental assessment of alternative energy production systems. Dr. Shabbir also presented a case study on the comparison of individual and central air-conditioning systems in a life cycle perspective.

Expert of Carbon Cycle Research visits JGSEE

During October 5-16, 2003, Dr. Stanley C. Tyler from Department of Earth System Sciences, University of California, Irvine (UCI), U.S.A. visited the JGSEE. Dr. Tyler is a world leader in research related to the application of stable isotope technique (^{13}C , ^2H and ^{15}N) to study the trace gas dynamics in the atmosphere as well as in terrestrial ecosystems. His works on stable carbon isotope have been recognized worldwide. His research has been supported by NSF, NASA and USDA.

He was at the JGSEE as the invited speaker in JGSEE seminars and as part of the continued collaboration with Dr. Amnat Chidthaisong on research of carbon dynamics in the tropics. He lectured on October 7 and 8, 2003 on the topics "Some recent studies of atmospheric CH_4 and its sources and sinks using measurements of ^{13}C and deuterium and 2-D chemical transport models" and "Methane production, oxidation, and transport in paddy fields deduced from measurements of C and H stable isotope ratios".

Dr. Tyler will co-supervise a JGSEE Ph.D. thesis with Dr.

Amnat Chidthaisong under the Royal Golden Jubilee Project Program, funded by the Thailand Research Fund. Collaboration in a research project between JGSEE and UCI has also been initiated, as he and the JGSEE staff in the Environmental Division will be submitting a research proposal on the topic of carbon budget in tropical agroecosystem to a funding agency in June 2004.

JGSEE Student Presentations

SETAC/ASE Asia Pacific Conference, September 28 – October 1 2003, Christchurch, New Zealand

Student : Mr. Wirawat Chaya (M.Phil. candidate)

Paper title : Evaluation of Environmental Effects and Energy Efficiency of Municipal Solid Waste Incineration in Thailand

Supervisor : Dr. Shabbir H. Gheewala, JGSEE

Co-supervisor : Assoc. Prof. Dr. Sirintornthep Towprayoon, JGSEE

2003 International Symposium on Regional Environmental Management: Policy, Research, Education, 6-9 November 2003, Chiang Mai, Thailand

Student : Mr. Wirawat Chaya (M.Phil. candidate)

Paper title : LCA: A Decision Support Tool to Evaluate Environmental Impacts of Sustainable MSW Management

Supervisor : Dr. Shabbir H. Gheewala, JGSEE

Co-supervisor : Assoc. Prof. Dr. Sirintornthep Towprayoon, JGSEE

EcoDesign2003: Third International Symposium on Environmentally Conscious Design and Inverse Manufacturing, 8-11 December 2003, Tokyo, Japan

Student : Ms. Wanida Wanichpongpan (M.Sc. candidate)

Paper title : Landfilling of Municipal Solid Waste in a Life Cycle Perspective

Supervisor : Dr. Shabbir H. Gheewala, JGSEE

Co-supervisor : Assoc. Prof. Dr. Sirintornthep Towprayoon, JGSEE

International Conference on “Electric Supply Industry in Transition: Issues and Prospects for Asia “, 14-16 January 2004 in Bangkok, Thailand

Student : Ms. Thipwimon Chungsangunsit (M.Sc. candidate)

Paper title : Environmental Assessment of Electricity Production from Rice Husk: A Case Study in Thailand

Supervisor : Dr. Shabbir H. Gheewala, JGSEE

Co-supervisor : Asst. Prof. Dr. Suthum Patumsawad, KMITNB

International Conference on “Electric Supply Industry in Transition: Issues and Prospects for Asia “, 14-16 January 2004 in Bangkok, Thailand

Student : Ms. Daranee Janghathaikul (M.Sc. candidate)

Paper title : Environmental Assessment of Power Generation from Bagasse at a Sugar Factory in Thailand

Supervisor : Dr. Shabbir H. Gheewala, JGSEE

1st International Conference on Onsite Wastewater Treatment & Recycling, 11-13 February 2004 in Perth, Australia

Student : Ms. Tassanee Yuangket (M.Sc. candidate)

Paper title : Use of Waste Sludge from Sugar Industry for Production of Briquettes

Supervisor : Asst. Prof. Dr. Soydoa Vinitnantharat, KMUTT

Co-supervisor : Asst. Prof. Dr. Suthum Patumsawad, KMITNB

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