

The 4<sup>th</sup> Government-Private Forum  
on the Cleaner Energy Future Initiative for ASEAN (CEFIA)

# CEFIA

## RENKEI Control Flagship Project

Presenters

Mike Suzuki (Azbil Corporation)

# Content



- What is RENKEI Control?
- Capacity Building (Education)
- Feasibility Study
- Visualization of RNEKEI contribution from 2020 to 2023
- Saudization of FMES

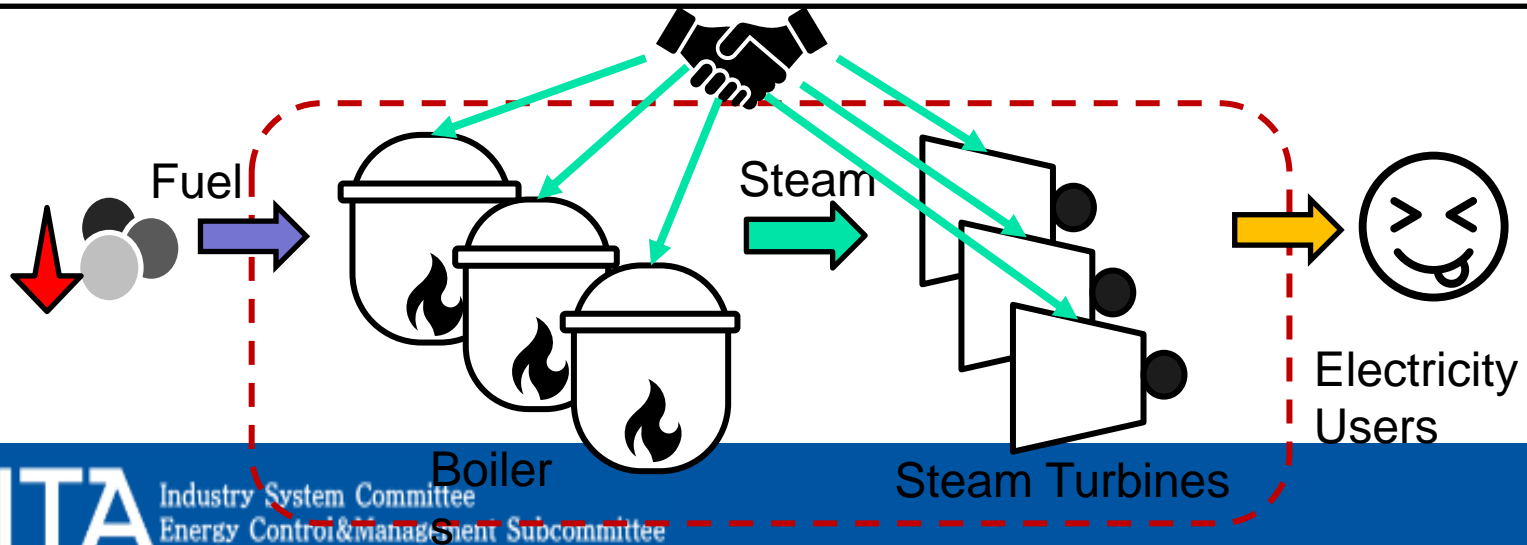
# What is RENKEI Control?

# Firstly, what is the meaning of Japanese word **RENKEI**?

**RENKEI** (連携) in the context of Japanese Language -  
Collaboration, Cooperation, Linkage, Together

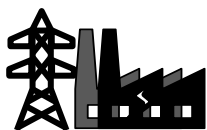


**RENKEI** in the context of control optimization  
Linking multiple equipment to collaborate together  
for optimum use of energy through control



# Applicable Optimization by RENKEI

	Category	Applicable Optimization by RENKEI
1	Utility Plant	<ul style="list-style-type: none"> <li>• Boiler Plant Optimization</li> <li>• Turbine Plant Optimization</li> <li>• Boiler Turbine Plant Optimization</li> <li>• Co-Generation Plant Optimization</li> <li>• Chilled Water Plant Optimization</li> <li>• Air Compressor Plant Optimization</li> </ul>
2	Utility Plant and Demand Side	<ul style="list-style-type: none"> <li>• District Cooling Plant Optimization with Demand Prediction for Building Side</li> <li>• Utility Plant and Manufacturing Plant Total Optimization</li> <li>• Smart City (Power and Heat) Total Optimization</li> </ul>



Utility Plants in many kind of industry.  
(Steam, Hot Water, Chilled Water, Electricity, Cogeneration)



District Cooling Plant for Buildings



Smart City

Energy Supplier    Energy Consumers

# Capacity Building (Education)

# Education with Chulalongkorn University

- E-learning course for students on CHULA MOOC (free online learning platform)

**JEITA** Japan Electronics and Information Technology Industries Association **CAPS**

## RENKEI Control

**Harmonization of Equipment for Improvement of Energy Efficiency**

**Instructors:**  
*Lee Peoy Ying*, Azbil Corporation, Japan.  
*Koji Takahashi*, Ministry of Economy, Trade and Industry, Japan.  
*Septia Buntara Supendi*, ASEAN Centre for Energy, Indonesia.  
*Prof. Yoshiharu AMANO*, Waseda University, Japan.  
*Tomoyuki Ikeyama*, Yokogawa Corporation, Japan.  
*Prof. David Banjerdpongchai*, Chulalongkorn University, Thailand

**Course Highlight**  
Introduction of Instrumentation Technology  
Introduction to RENKEI Control  
Introduction to Feasibility Study (FS)  
Introduction of Digital Transformation  
Introduction to subsidies and policy in Japan

**Target:**  
Electrical/Mechanical/Chemical Engineers or Interested Learners

**Free E-Learning**  
Registration by April 30, 2022  
90 days Access until 31 July 2022

**Enroll Now**



 **Chula**  
Center of Excellence in Electrical Power Technology

**JEITA** Japan Electronics and Information Technology Industries Association **CAPS**

## Course Outline

**Main Contents**  
1.1 Introduction of Instrumentation Technology  
1.2 Introduction to RENKEI Control  
1.3 Introduction to Feasibility Study (FS)

**Sub Contents**  
2.1 Introduction to CEFIA  
2.2 Introduction to ASEAN Plan of Action for Energy Cooperation and Collaboration with CEFIA  
2.3 Introduction of Digital Transformation  
2.4 Introduction to subsidies and policy in Japan

**Special Lectures**  
3.1 Energy Management System Shinjuku R&D Center and Industrial Open-Network Laboratory in Waseda University  
3.2 Supervisory Model Predictive Control of Air Conditioning System in Building

**Free E-Learning**  
Registration by April 30, 2022  
90 days Access until 31 July 2022

**Enroll Now**



 **Chula**  
Center of Excellence in Electrical Power Technology

# Education with TPA

## Webinar with Technology Promotion Association (TPA)

- Technology Promotion Association is non-profit organization for transferring latest technology and knowledge from Japan to Thailand.
- One of their activities is providing training and consultations to industrial sectors.

**"RENKEI Control" for Decarbonization Solution**

วันอังคารที่ 22 พฤศจิกายน 2565 เวลา 09:00 - 16:30 น.

ผ่านช่องทางออนไลน์ ZOOM

ฟรี ไม่มีค่าใช้จ่าย

อุตสาหกรรมพลังงานสะอาดกำลังก้าวสู่ยุคใหม่ด้วยเทคโนโลยีที่ทันสมัย... (Text describing the webinar content and its relevance to Thailand's energy transition goals.)

**ฟรี ไม่มีค่าใช้จ่าย**

สมัครฟรี ไม่มีค่าใช้จ่าย

สมัครฟรี ไม่มีค่าใช้จ่าย

**หัวข้อการสัมมนา**

- 1. Importance for Energy Management in Thailand**
  - 1.1 Carbon credit promote by Government
  - 1.2 Benefit of Factories and Building when to do Energy management
- 2. Introduction of Instrument Technology [Ms.Lee Peoy Ying]**
  - 2.1 Why Instrumentation is important?
    - Factory Energy Management System (FEMS) functions and improvement cycle of energy performance
  - 2.2 Typical Equipment and Their Measuring Points
    - Equipment : Boilers, Steam Turbines, Refrigerators (Types, Mechanism, Efficiency Calculation, Measuring Points)
  - Instrumentation Technology : Data Transmissions, Instrumentations (Flow Instrumentations, Temperature Instrumentation, Pressure Instrumentation)
- 3. Introduction to RENKEI Control [Mr.Mike Suzuki]**
  - 3.1 What is RENKEI Control?
  - 3.2 Step of RENKEI Control Project
  - 3.3 Example of RENKEI Control Project
  - 3.4 Application and Scalability of RENKEI Control
  - 3.5 Summary of RENKEI Control
- 4. Introduction Feasibility Study [Ms.Lee Peoy Ying]**
  - 4.1 What is Feasibility Study?
    - Steps for Feasibility Study
  - 4.2 Feasibility Study Example Practice
    - Boiler Turbine Generation (BTG)
- 5. Factory and Building Energy Management System**
  - 5.1 FEMS is very important to introduce RENKEI control into Factory: Yokogawa Electric Corporation
  - 5.2 To implement RENKEI control into Factory : Fuji Electric
  - 5.3 Energy Management in Building : Azbil Corporation
- 6. Conclusion for Customer Key Take away**
- 7. Activity In the future**
- 8. Question and Answer**

**วิทยากร**

- Ms.Lee Peoy Ying (Japan Electronics and Information Technology Industries Association :JEITA)
- Mr.Tomoyuki Iiyama (Yokogawa Electric Corporation)
- Mr.Mike Suzuki (Azbil Corporation)
- Mr.Sinakorn Nantakom (Azbil Corporation)

**ผู้ประสานงานประชาสัมพันธ์ภาษาไทย**

คุณพรศักดิ์ เสด็จอำนวยธรรม วิทยากรเครือข่าย สถาบันส่งเสริมเทคโนโลยี (ไทย-ญี่ปุ่น)

**สนใจ? ลงทะเบียน**

ผู้จัดในกรุงเทพฯ ขอเชิญลงทะเบียนฟรี... (Text about free registration and contact information.)

**REGISTRATION SCAN QR CODE E22PJ003SCL**

**ติดต่อสอบถาม**

สถาบันส่งเสริมเทคโนโลยี (ไทย-ญี่ปุ่น)  
 ฝ่ายประชาสัมพันธ์ภาษาไทย  
 กรุงเทพมหานคร 10110

E-mail : admin.scp@tps.or.th  
 Tel : 02-717-3000 flo 29 do 622, 629  
 www.tps.or.th, www.tpa.or.th











# Dissemination Webinar RENKEI Control

- Title: Adapt to Clean Energy Transition with RENKEI Control
- Date: 22<sup>nd</sup> February 2023 (Thursday)
- Time: 13:00 to 16:00 (GMT:+7 [Thailand and Indonesia])
- For registration:
  - <https://home.jeita.or.jp/indusys/2023-feb-22nd-renkei-seminar/>

**Speakers**

We also finished preparing language interpreter as Thai and Bahasa Indonesia

 <p><b>Mr. Atsuhiko Sawada</b> JEITA / Industry System Committee, Chair (Yokogawa Electric Corp./Japan)</p>	 <p><b>Mr. Kensuke SHIOMI</b> Assistant Director, Global Environmental Affairs Office, Industrial Science and Technology Policy and Environment Bureau, METI (Japan)</p>	 <p><b>Prof. Yoshiharu Amano</b> Dr. Eng. Professor / Department of Applied Mechanics and Aerospace Engineering, Waseda University (Japan)</p>	 <p><b>Mr. Mike Suzuki</b> JEITA / RENKEI control WG member (Azbil corp./Japan)</p>
 <p><b>Mr. Tomoyuki Ikeyama</b> JEITA / RENKEI control WG member (Yokogawa Electric Corp./Japan)</p>	 <p><b>TBD</b> The ASEAN Centre for Energy (ACE/Indonesia)</p>	 <p><b>Mr. Takuya Watanabe</b> JEITA / RENKEI control WG Convener (Fuji Electric Corp./Japan)</p>	 <p><b>Prof. David Banjerdpongchai</b> Chulalongkorn University (Thailand)</p>

# Dissemination with MJIT

## Dissemination activity with Malaysia-Japan International Institute of Technology (MJIT), University Teknologi Malaysia (UTM).

- 1<sup>st</sup> International Conference On Sustainable Chemical, Energy & Environmental Engineering (SCE) on 8<sup>th</sup> -9<sup>th</sup> March 2023



**FINAL CALL**  
1<sup>ST</sup> INTERNATIONAL CONFERENCE ON SUSTAINABLE  
CHEMICAL, ENERGY & ENVIRONMENTAL ENGINEERING

8-9 MARCH 2023 Hybrid (Kuala Lumpur, Malaysia/ Virtual) sce3.conference@utm.my

### CONFERENCE TOPICS

- Sustainable Chemical Engineering**  
Reaction engineering, catalysis and kinetics • Separation technology • Engineering safety • Process analysis, modelling and optimisation • Materials synthesis • Biochemical & biomedical engineering • Chemical engineering education
- Sustainable Energy Engineering**  
Process integration • Renewable energy • Fuel cells • Biomass technology (spalm oil, algae) • Smart energy system • Industrial energy efficiency • Energy saving • Clean technology • Water-food-energy nexus • Energy conversion technology • Energy management
- Sustainable Environmental Engineering**  
Emission footprints • Net zero carbon/ Circular economy • Environmental impact assessment • Life cycle assessment • Air pollution control • Water and wastewater engineering • Waste management • Resource recovery and conservation • Water quality and wastewater management

**Special Sessions:**

- Joint Seminar for Master of Sustainability and Environmental Sciences (Joint Degree Program) 2023

### IMPORTANT DATES

Call for papers 1 August 2022

Abstract submission (with CET) **18 November 2022**  
(present only) 31 January 2023

Abstract acceptance **5 days after submission**  
CHEMICAL ENGINEERING TRANSACTIONS (CET) FULL PAPER PUBLICATION

Full paper submission **30 November 2022**

Full paper revision Dec 2022 - Jan 2023

Full paper final acceptance 1 February 2023

Full paper publication Nov-Dec 2023

**REGISTRATION AND PAYMENT**

Early-bird registration deadline 10 February 2023

Regular registration deadline 25 February 2023

CONFERENCE 8-9 March 2023

### PUBLICATIONS

- ALL accepted abstracts would be included in the conference • book of abstracts with • ISBN.
- ALL peer-reviewed and accepted Full Paper manuscripts will be published in Chemical Engineering Transactions - CET (AIDIC, Scopus-indexed JOURNAL).
- Post-conference publication opportunities for selected presented research work to be extended into a full-length article for other peer-reviewed journals:
  - (a) Chemical Engineering Research and Design (Elsevier, Q2 SCIE)
  - (b) Energies (MDPI, Q3 SCIE, open-access journal, fee-water available)
  - (c) Cleaner Chemical Engineering (Elsevier, new open-access journal)
  - (d) Cleaner Energy System (Elsevier, new open-access journal)
  - (e) Process in Energy and Environment (Academia Baru, myCite-indexed open-access journal)
  - (f) Journal of Energy and Safety Technology (UTMpress, non-indexed open-access journal)

### REGISTRATION

Participant	Early-bird Before 10 Feb	Regular After 10 Feb
Physical	RM 1400 (325 USD)	RM 1600 (375 USD)
Virtual	RM 1000 (225 USD)	RM 1200 (275 USD)

• All registered persons are entitled to one CET publication and one presentation slot.  
• One "additional paper" option in CET publication is available for a registered participant at an extra charge.  
• All publications are subjected to review and acceptance.

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筑波大学  
UNIVERSITY OF TSUKUBA

**MORE INFORMATION**  
<https://mjit.utm.my/sce3/>

# Feasibility Study

# Feasibility Study

## Feasibility Study in Indonesia

- Target Process  
Boiler Turbine Generation (BTG) in Fertilizer Company in Indonesia
- Saving Strategy  
Boiler Load Allocation, Turbine Load Allocation
- CO2 reduction  
Around 10,000t-CO2/Year

## Feasibility Study in Thailand

- Target Process  
Air Compressor in Food Company in Thailand
- Saving Strategy  
Minimize Blow Off
- CO2 reduction  
Around 500t-CO2/Year

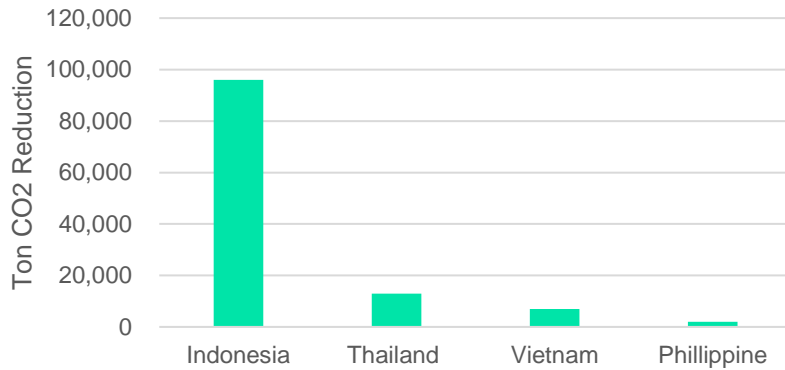
## Feasibility Study in Thailand

- Target Process  
Chiller in Food Company in Thailand
- Saving Strategy  
Minimize Discharge Pressure for Pumps
- CO2 reduction  
Around 450t-CO2/Year

# Visualization of RNEKEI contribution from 2020 to 2023

# RENKEI Contribution from 2020 to 2023

CO2 reduction from 2020 to 2023  
for JCM countries



**Industries:**

Indonesia-HVAC, Chiller, Boiler System  
Thailand-HVAC, Chiller, Air Compressor  
Vietnam-HVAC, Chiller  
Phillipine-HVAC, Chiller

CO2 reduction from 2020 to 2023  
for Non-JCM countries



**Industries:**

India – Steel Company  
China – Textile, Aluminum

# FEMS IEC Standardization

# IEC standard for FEMS which include RENKEI Control

This standard defines 10 functions categorized to 4 groups as FEMS functions.

**RENKEI control performs "Optimization" and "Instruction"**

