Solar PV Education in SEA: Experience Sharing in Collaborative Education

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Solar International Dialogue of South East Asia:
Strategizing PV in SEA – Next Chapter

October 13, 2021
SOLAR PV EDUCATION IN SEA

Traditional Education
Non-traditional education
Life long learning
Online courses
Capacity building
Trainings
Workshops
Seminar
Conferences
Disruption in Global Energy Sector

- Global energy sector is being disrupted by rapid change of technologies.
- The challenge in new energy development focuses on securing the profits of reliable, affordable and sustainable energy.
- The disruption creates a change in cost, technology capability, new business model, digital transformation, and change of policy.

Analysis Factor

<table>
<thead>
<tr>
<th>Technology</th>
<th>Challenge/Key success factors</th>
<th>Policy need/ Driving Mechanism</th>
<th>Market/ Future Trend</th>
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Academics Roles

AdiCET

Research

Education

Academic Service Community & Industry Development
Energy Programs from Universities

**Mae Jo University**
- M.Eng. (Renewable Energy Engineering)
- D.Eng (Renewable Energy Engineering)

**Naresuan University**
- M.S. (Renewable Energy)
- PhD. (Renewable Energy)
- M.S. (Smart Grid Technology)
- PhD. (Smart Grid Technology)

**University of Phayao**
- M.Eng. (Energy management and innovation)
- PhD. (Energy management and innovation)

**Thammasat University**
- PhD. (Energy and Environmental Management Technology -International Program)
- M. Eng. (Energy and Environmental Management Technology -International Program)

**Suranaree University of Technology**
- M. Eng. (Energy Management and Logistics)
- PhD. (Energy Management and Logistics)

**Chiang Mai University**
- M.Eng. (Energy Engineering)
- PhD. (Energy Engineering)

**King Mongkut’s University of Technology Thonburi**
- M.Eng. (Energy Technology)
- M.S. (Energy Technology)
- M.Eng. (Energy Management Technology)
- M.S. (Energy Management Technology)
- PhD. (Energy Technology)
- PhD. (Energy Management Technology)

**Rajamangala University of Technology Rattanakosin**
- M. Eng. (Smart Energy and Environmental Management)
- PhD. (Smart Energy and Environmental Management)

**Asian Institute of Technology**
- Master of Science (Energy)
- Doctor of Philosophy (Energy)
Energy Programs from Universities

- **Rajamangala University of Technology Thanyaburi**
  - D.Eng. (Material and Energy Engineering)
  - International Program

- **Sripatum University**
  - M.Eng. Energy and Environmental Management

- **Prince of Songkla University**
  - M.Eng. (Energy Technology)
  - M.S. (Sustainable Energy Management)
  - PhD. (Energy Technology)
  - PhD. (Sustainable Energy Management)

- **King Mongkut's University of Technology North Bangkok**
  - M.S. (Energy Technology and Management)

- **Mahasarakham University**
  - B.S. (Applied Physics in Energy)
  - M.S. (Energy)

- **Chulalongkorn University**
  - M.S. (Energy Technology and Management)

- **Silpakorn University**
  - M. Eng. (Energy Engineering)
  - PhD. (Energy Engineering)

- **The Joint Graduate School of Energy and Environment (JGSEE)**
  - Master of Engineering (Energy Technology & Management)
  - Master of Science (Energy Technology & Management)
  - Doctor of Philosophy (Energy Technology)

- **Rajamangala University of Technology Thanyaburi**
  - M.S. (Energy Technology and Management)

- **Chiang Mai Rajabhat University**
  - M.S. (Community Energy and Environment)
  - PhD. (Community Energy and Environment)
Sustainable-Green-Smart Community via Integration of Renewable Energy & Green Technology

Asian Development College for Community Economy and Technology, Chiang Mai Rajabhat University
702 kW PV - Grid Connected
CMRU
Community Energy and Environment Program
PV DC Microgrid
25.5 kW

PV AC Microgrid
25 kW

Biodiesel Generator
40 kW

Biomass Gasifier
20 kW
Smart Community Microgrid

Load:
1 office
1 minimart
1 restaurant
1 coffee shop
1 farm
6 houses
Flagship Projects:
#1 Smart Community Microgrid
#2 Zero Waste - Bioenergy Cycle
#3 Smart Community Development

Chiang Mai World Green City: Living Laboratory
“adiCET Flagship Project: Smart Community”

**Environmental**
- Air Quality Level
- Water usage
- Recycle waste (kg)
- Organic waste (kg)
- Hazardous waste (kg)
- The frequency of dumping waste (time)
- Date/time

**Energy**
- Electricity, Heat
- Production
- Consumption
- Raw material of biogas and charcoal production (kg)
- Biogas and charcoal yield/consumption (kg)
- Fuel consumption in transportation (L)
- Date/time

**Building**
- Indoor/Outdoor temperature (°C) and humidity (%)
- Outdoor solar intensity (W/m²) and wind velocity (m/s)
- Water consumption (L) / Water flow rate average (L/min)
- Quality (Nephelometric Turbidity Units, pH, Coliform, BOD)
- Particulate in the air (PM)
- The frequency of using water (Time)
- Date/time

**Food**
- Food production (Kg)
- Using fertilizer (Kg)
- Another material in cultivation (Kg)
- Consumption and sale (Kg)
- Date/time

**Economic**
- Expenses (Baht)
- Income (Baht)
- Date/time

“Analyze Community Context → Balanced Community → Responsible Consumption & Production”
Community Data Monitoring

Power

Fuel

Water

Waste
Technology Transfer through Workshop & Training
Thinking Process - Integration with the Community
Rural Village Electrification to Improve the Quality of Life based on Sufficiency Economy for Lampoon Communities

Renewable Energy for Sustainability Association

Supported by Energy Conservation Fund, Ministry of Energy, Thailand
Community Engagement and Decision Making
Microgrid Model for Rural Village Electrification

<<< Pha Dan

Mae Sa Ngae >>>

Pong Pang >>>
University Program Collaboration

• CMRU – adiCET
  • Master of Science in Community Energy and Environment
  • Ph.D. in Community Energy and Environment

• Dual Degree
  • National Chin-Yi University of Technology – CMRU
    • Master Degree Program in Refrigeration, Air-Conditioning and Energy Engineering
    Department of Refrigeration, Air-Conditioning and Energy Engineering
    • Ph.D. Degree Program in Precision Manufacturing, Graduated Institute of Precision Manufacturing
  
  • Feng Chia University – CMRU
    • Master’s Program of Green Energy Science and Technology

• Student Exchanges
• Staff Exchanges
• Conferences/Workshop Co-Organizing
• Student Competitions
Online Education

Smart Grid Thailand
Collaborative Seminars: University & Private Sectors
PV Programs from Government Agency

"โครงการศึกษาโครงสร้างและการกำกับ\nกิจการก้าซ่อมระบบ\nภายใต้โครงสร้างกิจการไฟฟ้าแบบ\nENHANCED SINGLE BUYER"

จัดโดย สำนักงานคณะกรรมการกีฬาสิ่งแวดล้อม
วันศุกร์ที่ 8 ตุลาคม 2564\nเวลา 08.45 – 12.00 น.

ฟ้าฟ้าห้องสมุดที่สำคัญ
• การวิเคราะห์ TPA REGIME และ TPA CODE
• การวิเคราะห์ TSO FRAMEWORK และ TSO CODE
• แนวทางการบริหารจัดการและกลไกการส่งเสริมการแข่งขันใน\nกิจการก้าซ่อมระบบของประเทศไทยและต่างประเทศ
• การออกแบบระบบตลาดที่ส่งเสริมการแข่งขันในกิจการ\nก้าซ่อมระบบเพื่อการแข่งขันภายใต้โครงสร้างกิจการ\nไฟฟ้าแบบ ENHANCED SINGLE BUYER

ฟรี
ลงทะเบียนเข้าร่วมสั่งสมออนไลน์
เข้าร่วมฟรีสั่งสมออนไลน์

ZOOM ID: 6302618513
PASSCODE: 337857

FACBOOK LIVE
"ROMM.MUTR"

FORUM

The 2nd Workshop on Enhancing Climate Adaptation Capacity of\nASEAN Energy System through the Concept of Energy Resilience\nCOST Priority 2021
21 September 2021
9:00-12:00 (GMT+7)
Virtually at Zoom Meeting
https://zoom.us/j/78157403271

Meet Our Speakers

Welcome Remarks
Dr. Julleleep Kajjarchakol\nDirector, Natural Energy Technology Center (ENTC), National Science and Technology Development Agency (NSTDA), Thailand

Opening Remarks
Assoc. Prof. Dr. Poottakintii\nInnovation and Technology Promotion Office, Ministry of Science and Technology, Thailand

Special Remarks
Dr. Nult Aqa Ismale\nUbon Ratchathani University, Thailand

Cooling Remarks
Dr. Prapas Pimomboonwa\nInnovation and Technology Promotion Office, Ministry of Science and Technology, Thailand

1st Workshop Recap

Issues affecting resilience of energy supply and demand solutions (1)
By: Yong Chong Yee, P.Eng., President, Energy & Environment Consulting, Malaysia

Issues affecting resilience of energy supply and demand solutions (2)
By: Assoc. Prof. Dr. Sudarat Taksuda, Chulalongkorn University, Thailand

Issues affecting resilience of energy supply and demand solutions (3)
By: Dr. Piyapong Jantae, National Energy Technology Center (ENTC), National Science and Technology Development Agency (NSTDA), Thailand

Experience Sharing

Dr. Thanaboon Sriroong\nNational Energy Technology Center (ENTC), National Science and Technology Development Agency (NSTDA), Thailand

Dr. Huthaboon Supac\nNational Energy Technology Center (ENTC), National Science and Technology Development Agency (NSTDA), Thailand

Dr. Thatchai Jittapong\nInnovation and Technology Promotion Office, Ministry of Science and Technology, Thailand

Panel Discussion

Dr. Prasit Maneerat\nDepartment of Alternative Energy Development and Efficiency (DEDE), Ministry of Energy, Thailand

Assoc. Prof. Dr. Nimit Yenita\nSilpakorn University, Thailand

Dr. Maowong Cholaprap\nNational Energy Technology Center (ENTC), National Science and Technology Development Agency (NSTDA), Thailand

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Email: prapas@ntp.or.th

Associate Register:
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Email: kaminparat@ntk.or.th

Pre-Registration:
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Innovation and Technology Promotion Office, Ministry of Science and Technology, Thailand
Email: prapas@ntp.or.th
PV Programs from Utilities

IEEE Power & Energy Society Webinar Series 2021
Flexibility and Enabling Technologies for Deregulated Market

Friday 8th October, 2021
09.00 a.m. - 01.15 p.m.

Opening Session
Mr. Somsak Hamsilitjuew
Deputy Governor - Technology and Meters Management,
Metropolitan Electricity Authority MEA

Chairman - Rectenna & Social Activities Subcommittee,
IEEE Power & Energy Society – Thailand

Session Chair:
Assoc. Prof. Dr. Noppharat Lopphipranon,
Department of Electrical and Computer Engineering,
Thammasat University

01.15 p.m. - 02.30 p.m.
Flexibility and Enabling Technologies for Deregulated Market
by Mr. Thomas Portland
Digital Grid Sales,
East & Southeast Asia, Schneider Electric

02.30 p.m. - 03.30 p.m.
Utilization of Voltage Rise Due to High Penetration of Solar PV
MEA Case Study
By Miss Nattindrome Treetipak
Electrical Engineer 6,
Electrical System Planning Division, Power System Planning and
Smart Grid Department, MEA

03.30 p.m. - 04.00 p.m.
Questions & Answers

Closing Session

Supported by: Schneider Electric

Registration:
https://tmia-jm/2022/01/01/19/6
PV Programs from Expo

Impact of COVID-19 Pandemic on ASEAN Energy Sector

Smart Renewable Energy Integration for Power System Resilience

The ASEAN Electric Vehicle Industry Outlook post Covid-19
Summary

“Solar PV Education in SEA
Strategizing PV in SEA – Next Chapter”

• Numerous programs for Solar PV Education both traditional and non-traditional education
• Lifelong learning ➔ Awareness, Upskill, Reskill
• Solar PV Education
  • ➔ Application toward Disruptive technologies: Smart Grid, EVs, Energy Storage, V2G, Green Buildings, AI, Blockchain…
  • ➔ Project Development, Technical, Business, Regulation & Policy
• Appropriate learning based on country context, application, learner
• Collaboration & Sharing Resources is the KEY!!
Thank you – Kob Khun Ka