16 - 18 AUG 2017 | 9:00AM TO 5:00PM | WWW.SEAS.ORG.SG

UTILITY-SCALE SOLAR PV PROJECT FEASIBILITY & DEVELOPMENT

TECHNICAL & COMMERCIAL FUNDAMENTALS

COURSE OVERVIEW

Commercially competitive prices for solar PV and to a lesser extent onshore wind projects have sparked a jump in the share of these two renewable energy sources in power sectors worldwide. Asian countries, especially China, India and Japan have made considerable progress in expanding the role of non-hydro renewables in their energy supply systems with solar PV projects accounting for a significant percentage of the growth in non-hydro renewable projects.

This workshop will help you to master the techniques for assessing the technical and economic feasibility of utility-scale solar PV systems. After introducing the technical fundamentals of PV, the trainers will provide an overview of the solar PV programs and policies in various Asian countries and then introduce participants to the methods and data sources for determining the technical performance and financial sustainability of solar PV projects. Participants will receive hands-on training in the use of public domain software, known as the System Analysis Model (SAM), CREST and PVWatts, which participants will use during the workshop to assess the technical and financial performance of a 150 MW PV solar project located at a hypothetical site in Asia.

As part of the Solar PV workshop, participants will also evaluate the impact of a CO_2 emissions tax and other commercial factors on the financial performance of solar PV projects and will compare the levelised cost of electricity from solar PV, coal and gas power projects. The workshop will introduce participants to methods of technical and financial analysis used for evaluating solar PV projects. Participants will come away from the workshop with a practitioner's understanding of the technical and cost details of solar PV projects as well as the similarities and differences between a solar PV PPA and a fossil fuel PPA.

This workshop is aimed at all professions and companies involved in developing power projects in the region and will help them make more informed decisions regarding the competitive advantages and weaknesses of solar PV projects relative to base load coal and gas projects.

KEY LEARNING OUTCOMES

- Fundamentals of PV technology, economics & future developments
- Overview of solar PV markets in Asia
- Solar PV project development considerations for the Asia-Pacific region
- Technical issues impacting project delivery, net electrical output and project ROIs
- Criteria for assessing commercial feasibility of solar PV projects
- Comparative LCOE analysis for solar PV, coal and gas power projects in Asia
- Major differences between fossil fuel and solar PV PPA terms
- Fuel risk of fossil fuel projects vs resource intermittency of solar PV projects
- Regulatory factors and their impact on solar PV projects

TARGET AUDIENCES

- Power plant developers and equipment suppliers
- Power buyers
- Fuel traders and buyers
- Financiers
- Technical consultants and engineers
- Lawyers, accountants and industry consultants
- Energy derivative traders & renewable energy analysts & developers
- Government officials especially managers from State-owned power companies & energy sector regulators

SCEM-PDUs AWARDED BY INSTITUE OF ENGINEERS, SINGAPORE

PDUs TO BE AWARDED BY PROFESSIONAL ENGINEERS BOARD, SINGAPORE

APPLICABLE FOR PRODUCTIVITY AND INNOVATION CREDIT (PIC)

SEAS
Sustainable Energy Association of Singapore

16 - 18 AUGUST 2017
9:00AM - 5:00PM
SEAS Office@Sky Park
180 Kitchener Road #06-10 City Square Mall Singapore 208539

SEAS
Sustainable Energy Association of Singapore

UTILITY-SCALE SOLAR PV PROJECT FEASIBILITY & DEVELOPMENT

PROGRAMME OUTLINE

Day 1

- Workshop objectives and quick review of workshop topics
- Introduction to PV technology
  - What is PV and how does it work?
  - Understanding light - the fuel for PV plants
  - Comparing PV technologies
- Recent developments for solar PV projects in Asia
  - PV economics
  - Changes in the energy mix of Asian power sectors & forecasted increased role for solar energy
  - Overview of governemnt policies and their importance in driving the implementation of solar PV power projects
  - Issues in implementing solar PV projects in Asia

Day 2

- Overview of project development process for a solar PV project
- Assessing solar PV sites, technical performance, net electrical output & costs of PV projects
- Solar PV's impact on the grid and consequences for policy
- Review of public domain software and methods and data sources for assessing the technical performance and net electric output of solar PV power project
- Estimating the LCOE for a hypothetical solar PV project in Asia

Day 3

- Comparing terms for a solar PV Power Purchase Agreement (PPA) with those of a PPA for a coal-fired power plant project
- Sample calculations of electricity price adjustments under standard PPA terms
- Solar PV case study 1: State of Telegana (India) solar auctions
- Solar PV case study 2: China's experience implementing solar PV projects
- Case analysis
- Student presentation of their solar PV case analyses
- Seminar wrap-up including final Q&A session

Detailed programme can be downloaded from SEAS website.

ABOUT THE TRAINERS

Mr. Christophe Inglin has twenty years of solar PV experience throughout the value chain ranging from manufacturing silicon ingots to installing turnkey solar power plants. He is currently co-founder and Managing Director of Energetix Pte Ltd, which designs, installs and maintains rooftop solar power plants and utility-scale solar farms. He has lived in Singapore since 1996 and shares his extensive experience in the solar PV business by conducting frequent courses on solar PV technology throughout Asia and the Middle East.

Dr. Bart Lucarelli has 34 years of experience developing, analysing and implementing power projects and assessing power and fossil fuel markets, with 26 of those years spent in Asia. He is the Managing Director of Roleva Energy Ltd, which he founded in 2004, and has been a frequent speaker at power and fuel conferences in the region. He has had extensive experience assessing coal price trends and the economics of coal and gas-fired power projects in Asia and has recently expanded his assessments to include comparative studies into the economics of solar and wind electric plants and coal, gas and nuclear plants in Asia. He resides in Bangkok and has a PhD from the University of California at Berkeley.

Detailed trainers' bio can be downloaded from SEAS website.

RATES

EARLY BIRD (before 23 Jun)	NORMAL FEE	GROUP FEE
S$1,500 (SEAS Member) S$1,700 (Non Member)	S$1,700 (SEAS Member) S$1,950 (Non Member)	S$1,500 (4+ delegates from 1 orginization)

* **Fees inclusive of GST**
* **SEAS reserves the right to make changes to the trainer, programme, venue, cancel or reschedule the programme if necessary or warranted by circumstances beyond our contral**
* **Payment to be made by the early bird closing date to enjoy early bird rate**
* **Payment to SEAS & Address:** Please send a crossed cheque to:
  Sustainable Energy Association of Singapore, 180 Kitchener Road, #06-10 City Square Mall (S) 208539

CALL US AT 6338 8578 TO ENQUIRE

REGISTRATION FORM

☐ Yes! I would like to register for this programme ☐ I am unable to attend but please put me on your mailing list

PARTICIPANT'S DETAILS	Number of Delegates	Fees Payable		
1	Name (Dr/Mr/Mrs/Ms)		NRIC No	Designation
	HP No	Email		PEB ☐ SCEM ☐
2	Name (Dr/Mr/Mrs/Ms)		NRIC No	Designation
	HP No	Email		PEB ☐ SCEM ☐

ORGANISATION'S DETAILS

Company Name

Company Address

Contact Name	Tel
Email	Fax