FUNDAMENTALS OF SUPERCRITICAL & ULTRA-SUPER CRITICAL COAL-FIRED POWER PLANTS

27 – 28 NOVEMBER 2017, KUALA LUMPUR, MALAYSIA

TOPICS COVERED

Setting the scene – international developments

Pulverised Fuel (PF) technologies and power plant designs

Fuel quality issues

Review of Supercritical (SC) and Ultra-Supercritical (USC) technologies

Other technical features in supercritical power plants

Case Studies of supercritical and ultra-supercritical plants

Overview of international RD&D Programmes into the development of Advanced-USC Technologies

Scheduled for commercialisation before 2030

Fluidised Bed Combustion Systems

Another Quality Training By
About This Training Course

Supercritical and ultra-supercritical coal-fired combustion systems operate at higher temperatures and pressures and can achieve enhanced thermal efficiencies [in excess of 45% HHV] compared to conventional sub-critical pulverised coal combustion units.

The supercritical plants can also achieve significant reductions per KWh in CO2 emissions.

Supercritical steam cycle technology has been utilised commercially since the 1980s and is becoming the system of choice for new coal-fired plants in many countries – particularly the new generation of coal-fired generation units being constructed throughout the Asia-Pacific Region.

Ultra-supercritical units are now commercially available and can achieve higher thermal efficiencies. During the next decade new ultra-supercritical coal-fired plant will achieve thermal efficiencies of up to 50% HHV.

Operating at higher temperatures and pressures is achieved by the redesign of power plants – including the boiler and heat recovery systems. New plants utilise advanced steel alloys which minimise corrosion and allow higher load factors. However, plant operators have to be fully aware of the challenges of using coal as a fuel.

Other coal combustion technologies [including circulating fluidised bed combustion systems] are also adopting supercritical technologies – which will allow further improvements in plant thermal efficiencies.

This training course will provide a detailed understanding of the concepts of supercritical combustion

Course Learning Outcome

This two-day training course will be valuable to anyone seeking to obtain an understanding of the fundamental technical, economic and environmental issues affecting the development of the new generation of coal-fired plant which utilise higher efficiency supercritical technologies.

Who Should Attend

The following professionals from utilities companies, coal producers, coal technology companies, consultancies, Government and regulatory bodies, plus financial institutions will find this training course of value:

- Coal sector consultants and market representatives
- Power Engineering Professionals
- Energy R&D Executives
- Process Engineers
- Plant Developers and Project Managers
- Environmental Managers
- EPCIC Executives
- Governmental Regulators
- New investment or capital funding executives
Introduction

- Course outline
- Essential further reading and sources of information

Setting the scene – international developments

- The general drivers of clean coal technologies
- Why develop Supercritical [SC] and Ultra-Supercritical [USC] plant?

Pulverised Fuel (PF) technologies and power plant designs

- Introduction
- Boiler systems - two-pass or tower/single-pass designs – or hybrid designs.
- Boiler design features
- Burner designs and configurations
- Turbine design issues
- What are the advantages, strengths and weaknesses of SC systems v. sub-critical pf systems and other power generation technologies

Fuel quality issues

- Impacts of coal specifications/qualities on plant operations and overall efficiency
- Developing a holistic approach to using coal as a fuel
- Ash fouling, deposition and slagging - how these problems can be minimised by plant operators
- Power Station Computer Models and Operating Systems - Plant monitoring and software systems

Review of Supercritical (SC) and Ultra-Supercritical (USC) technologies

- Supercriticality and SC plant classification
- Benson once-through systems and other technologies
- Supercritical steam conditions
- Sliding Steam Pressure
- Evolution of Supercritical power plant technologies

Other technical features in supercritical power plants

- Water chemistry inside boiler tubes – comparison of all-volatile treatment with oxygenated water treatment processes
- Alloys in Supercritical PF Coal-fired Plants
- International Boiler Codes
- Steam turbine material selection Issues

Case Studies of supercritical and ultra-supercritical plants

- Several plants will be reviewed which are either operational or currently under construction
- Relevant Information on the manufacturers of supercritical and ultra-supercritical plant and equipment is included in this section

Overview of international RD&D Programmes into the development of Advanced-USC Technologies

- Scheduled for commercialisation before 2030 - these advanced power plants will operate above 700°C and 34.5MPa. They require the development of advanced alloys and other technologies

Fluidised Bed Combustion Systems

- Key features of circulating fluidised bed combustion [CFBC] systems and other power technologies will be outlined. Manufacturers are now marketing a range of power plant designs which operate at SC and USC temperatures and pressures
- Case studies of new supercritical CFBC plant being constructed throughout the world

Cogeneration

- Development of supercritical cogeneration schemes

Glossary of key technical terms
Course Conclusions
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Frequently Asked Questions (FAQs)

1. Does PowerEdge have other programmes than those listed?
   We have more than 200 programmes that we are capable of running. All we need is for you to contact us and request for the preferred programme and we will able to develop it.

2. Where is PowerEdge based?
   PowerEDGE is headquartered in Singapore but we run our training programmes in different venues around Asia.

3. What does PowerEdge do?
   We are a Power & Utilities Training Specialist.

4. Can this course be done in our city?
   It absolutely can. Get in touch with us to request for a training programme to be carried out in your city.

5. Can you reduce the price of our preferred course?
   While our price has been reduced before it is even launched, we are always happy to help you with further discounts.

6. Can you change the dates of the course?
   If you have a special requested date, let us know and we will arrange another session for you.

7. Who are the companies that will be participating?
   This varies from a diversity of Power Operators, Regulators, Financiers, to Vendors in the Power & Utilities industry.

8. Where is the venue for the course?
   We usually engage a 4 to 5 star hotel meeting room to ensure the comfort of our participants.

9. How many delegates should we expect for each course?
   This varies from 15 to 20 participants. Class sizes are kept small to allow trainers to focus better on each participant.

10. What are the different payment modes?
    We accept Visa/MasterCard, cheques, bank transfers and cash on site.

11. Is accommodation included when I sign up for a course?
    Accommodation is not included in the course fee but we are always happy to advise on available accommodations.

12. Can I get a cheaper accommodation through PowerEdge?
    We will be pleased to help you negotiate a better rate with hotels.

13. Is lunch provided during the course?
    We provide lunch and 2 tea breaks every day during our training programmes.

14. Are the training materials included once I have signed up for a course?
    Yes, training and course materials are included in the course fee.

15. Will there be a certificate for the course?
    Yes, there will be a certificate of participation upon completion of a course.

16. Who are PowerEdge trainers?
    They are expert consultants and practitioners with many years of experience in the subject matter that they deliver on.

17. Are PowerEdge trainers competent?
    We have received numerous favourable feedbacks on our trainers from past participants.

18. Can PowerEdge assist with Visa travel applications?
    We can assist in advising you on the relevant procedure(s) and embassies/consulates that provide Visa for travel purposes.

19. Can we purchase training materials without attending a course?
    Unfortunately this option is not available as training materials are specially developed for courses.

20. Can course content be tweaked to cater to our needs?
    Of course! Just let us know your request and we will get the trainer to assist in carrying it out.
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<th>IN-HOUSE TRAINING</th>
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<td></td>
<td>SGD 2,700 Per Participant (*GST Exclusive)</td>
<td>SGD 2,300 Per Participant (*GST Exclusive)</td>
<td>Guaranteed Minimum 40% Off Normal Price</td>
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<td>2 Day Programme</td>
<td>SGD 2,889 Per Participant (GST Inclusive)</td>
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*GST FOR SINGAPORE REGISTERED COMPANIES

ATTENDEE DETAILS

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COMPANY DETAILS

Name ............................................................................................................. Industry..........................................................................................
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PAYMENT METHOD

By Cheque/ Bank Draft: Make Payable to PowerEdge Pte Ltd.
By Telegraphic Transfer: Please quote AE1 with the remittance advise
Account Name: PowerEdge Pte Ltd.
Bank Address: 65 Chulia Street OCBC Centre, Singapore 049513
All bank charges and payment in Singapore dollars (SGD) to be borne by payer. Please ensure that PowerEdge Pte Ltd receive the full invoiced amount.

CANCELLATIONS & SUBSTITUTIONS

Payment is due in full at the time of registration. Full payment is mandatory for event attendance. I agree to PowerEdge Pte Ltd. payment terms
* GST- Exclusive price is only applicable for overseas corporate customers subject to qualifying conditions.

You may substitute delegates at any time. POWEREDGE PTE LTD does not provide refunds for cancellations. For cancellations received in writing more than seven (7) days prior to the training course you will receive a 100% credit to be used at another POWEREDGE PTE LTD training course for up to one year from the date of issuance. For cancellations received seven (7) days or less prior to an event (excluding day 7), no credits will be issued. In the event that POWEREDGE PTE LTD cancels the event, delegate payments at the date of cancellation will be credited to a future POWEREDGE PTE LTD event. This credit will be available for up to one year from the date of issuance. In the event that POWEREDGE PTE LTD postpones an event, delegate payments at the postponement date will be credited towards the rescheduled date. If the delegate is unable to attend the rescheduled event, the delegate will receive a 100% credit.

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RELATED TRAINING

- Keeping Electrical Switchgear Safe
- Introduction to Power Systems
- Excitation Systems
- Fundamentals of Power Generation

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Simply let us know your preferred time and dates and we will meet you at your schedule and venue.
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