

# COST ESTIMATING METHODOLOGIES FOR SUBSTATION AND TRANSMISSION PROJECTS

September 17-18, 2020  
Online | Central Time

## EUCI ONLINE COURSE

EUCI is pleased to offer this course on our online interactive platform. Enjoy a valuable learning experience with a smaller impact on your time and at reduced cost. You will gain new knowledge, skills, and hands-on experience from the comfort of your remote location.

### POST-COURSE WORKSHOP

## Cost Estimating 201

FRIDAY, SEPTEMBER 18, 2020

“

*“Excellent content, great speakers,  
wonderful accommodations!”*

Estimator, 3 Phase Line Construction



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EUCI is authorized by  
IACET to offer 1.0 CEUs  
for the course and 0.4  
CEUs workshop

## OVERVIEW

In this course, attendees will recognize the critical components to consider in a transmission and substation project estimate. Key components of the course include all factors that impact the final cost of building this infrastructure, including permitting and siting, materials and engineering, construction, and project management.

The training will stress that throughout North America, the need for new utility projects is projected to grow to improve electricity delivery, increase capacities, improve reliability, and meet new standards associated with incorporating renewable energy generation into the smart grid. In order to effectively utilize allocated and dedicated funding, it is critical for utilities, developers, sub-contractors, project managers, and suppliers to fully understand efficient utility project cost estimation, as this new infrastructure has substantial costs and risks associated with each project. In fact, new overhead transmission lines can cost \$1 million or more per mile. The process of building transmission and substation level projects often takes many years—even in the most streamlined process.

This program's end goal is for attendees to develop a full understanding of the estimating process so they can return to their team and feel comfortable executing educated, in-depth conversations on the topic of cost estimating methodologies.

## LEARNING OUTCOMES

- Discuss utility project planning process and budget considerations utilizing industry samples of typical industry projects
- Discuss the environmental and siting processes and the impact on schedules and costs
- Analyze engineering, material cost, and construction considerations for transmission lines and substations
- Compare and contrast contracting methods to include design-bid-build vs. OE/EPC
- Identify strategies to mitigate risks across the spectrum of project types and sizes

## WHO SHOULD ATTEND

- Transmission and substation project managers, estimators, and contract managers who are new to the job
- Transmission and substation engineers
- Supply chain and cost accounting professionals for utilities and other energy companies
- Generation project developers and engineers who need an understanding of transmission components and costs
- Regulatory agency staff
- Consultants and engineering firms that work within the electricity transmission sector



***“As an estimator in the power industry this course was exactly what I needed in filling gaps in my utility knowledge.”***

Estimator, Kenny Construction Company

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# AGENDA

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THURSDAY, SEPTEMBER 17, 2020

- |                          |                      |
|--------------------------|----------------------|
| <b>8:45 – 9:00 am</b>    | <b>Log In</b>        |
| <b>9:00 am – 4:30 pm</b> | <b>Course Timing</b> |
| <b>12:30 – 1:15 pm</b>   | <b>Lunch Break</b>   |

## **Session I:**

### **Costs for Major Utility Projects: Substations, Overhead Transmission, and Underground Transmission**

Group discussion of major components, including materials and construction

#### **Project Begins at the Substation**

- Planning
- Site development

#### **Conduit & Grounding Plan**

- Foundations
- Materials
- Substation bus
- Conductor/cables overhead

#### **Transmission Lines**

- Plan & profile
- Staking
- Foundations
- Structures
- Hardware

#### **Underground Transmission Lines**

- Plan & profile
- Duct bank
- Line splice and pull-through vault
- Line cable
- Line substation riser details

## **Session II:**

### **Permitting, Siting, and Right of Way Considerations and Costs**

- Overview of environmental siting process
- Potential impacts to project timelines and costs
- Urban vs rural considerations
- Construction considerations
- Strategies to minimize schedule obstacles

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# AGENDA

THURSDAY, SEPTEMBER 17, 2020 (CONTINUED)

## Session III:

### Utility Cost Estimation Process

- Developing budget parameters and the project plan
- Utility estimate components
- Cost estimating best practices during the project life cycle
- Cost reference development
- Risk management
- Expected accuracy ranges
- Measuring performance
- Project cost estimate example

FRIDAY, SEPTEMBER 18, 2020

**8:45 – 9:00 am**      **Log In**

**9:00 am – 12:00 pm**      **Course Timing**

## Session IV:

### Methods of Contracting

- Identify common types of contracts and contract delivery methods and understand the risks and advantages and disadvantages associated with each
- Fixed price/lump sum
- Cost plus
- Time and material
- Traditional arrangement/design-bid-build
- EPC arrangements and risk management
- Open book EPC variations
- Impacts to construction process

## Session V:

### Project Cost Estimate Case Study

Class exercise to estimate major categories of project costs compared to actual costs on two real life projects



*“I am from NYISO, a new Planning Engineer. I took on the responsibility of cost-estimation. I think I walked into the water without knowing the depth. This course gave me the life jacket to survive.”*

Planning Engineer, NYISO

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## POST-COURSE WORKSHOP

# Cost Estimating 201

FRIDAY, SEPTEMBER 18, 2020

**12:45 – 1:00 pm**

**Log In**

**1:00 – 5:00 pm**

**Workshop Timing**

## OVERVIEW

This workshop is geared towards those who would like a further understanding of the cost estimating process and experience a more in-depth teaching session, after they've attended the Cost Estimating Methodologies course. Attendees will learn more of the guidelines for different types of estimating projects, as well as how to use these guides. Attendees will also be working with real-life examples so they can dig deeper into the process and gain a full understanding of cost estimating for substation and transmission projects.

Class participation will provide opportunity for professional networking and learning from others who are actively involved in estimating large projects.

## LEARNING OUTCOMES

- Review how to apply AACE guides to major power projects and how the guides can be used to provide meaningful information to utility managers
- Calculate risk management parameters based on known project information
- Use different Estimating tools currently available to the industry
- Participate in exercises in developing revised cost estimates throughout the project life cycle
- Identify how to prepare CE for both a small EPC solar project and a large EPC transmission project

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# AGENDA

FRIDAY, SEPTEMBER 18, 2020 - CENTRAL TIME

**12:30 – 1:00 pm**      **Workshop Registration**

**1:00 – 5:00 pm**      **Workshop Timing**

1. Review of cost estimating principles
2. Types of cost estimates and how they are used
3. Cost estimating guidelines - the application of AACE recommended practices to major power projects and how they can be used to provide meaningful information to utility managers
  - a. AACE 96R, 69R, 56R, etc.
  - b. How to use the Guides for different types of projects
  - c. Application of Contingency
  - d. Expected Accuracy Range
  - e. Confidence Interval
4. Identification of critical project elements
  - a. Substation
  - b. Transmission
  - c. Distribution
  - d. Generation
5. Cost estimating tools commonly used in the industry<sup>1</sup>.
6. Class exercise - Building a cost estimate from the bottom up for:
  - a. Solar Garden
  - b. Gas Turbine
  - c. Transmission Line

Class participation will provide opportunity for professional networking and learning from others who are actively involved in estimating large projects.



***“Great course to review key elements in the estimating process.”***

Professional Engineer, Quanta



***“Great course for basic methods and industry practices.”***

Operation Support Specialist, Irby Construction

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# COURSE AND WORKSHOP INSTRUCTORS



## Edward Weber

**Senior Transmission Planning Advisor/Project Manager, HDR Engineering Inc.**

Ed Weber is a senior electrical engineer with over 35 years of experience in power system analysis and planning throughout the US. He has extensive experience in power system reliability compliance and system modeling, power flow and stability analysis, transmission tariff process, and generator interconnections. Ed's experience includes over 30 years of management of large power projects requiring coordination of project planning, design, and environmental activities; coordination of consultant activities; coordination of regulatory and contractual activities; interfacing with the developers and transmission owners and operators; and preparation of technical reports. He has supervised a diverse staff of professional engineers and was responsible for all facets of power system planning and operational support across the country. Since coming to HDR Engineering, Ed has worked on several large transmission and generation projects along with conducting numerous planning and interconnection studies for a long list of clients.



## Jay Turner, EIT, PMP, Six Sigma Green Belt

**Project Controls Major Projects Advisor, Southern California Edison**

Jay Turner has fifteen years of cost estimating, project management, root cause analysis, and process improvement experience in the utility, accounting, and consulting industries. He currently estimates and tracks project costs for transmission, substation, and generation projects for Southern California Edison. Jay has been certified as a Project Management Professional by the Project Management Institute and a Six Sigma Green Belt by the Institute of Industrial Engineers. He earned his M.B.A. and M.S. Systems Engineering from Loyola Marymount University and his B.S. in Engineering and Applied Science from the California Institute of Technology.



***"The instructors are industry experts that are engaging, knowledgeable, and professional. The course is worth the trip."***

Project Manager, Puget Sound Energy



***"Ed and Jay were great! Good material and great discussions."***

Researcher, NREC

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## INSTRUCTIONAL METHODS

PowerPoint presentations, interactive group exercise, and group discussion will be used during this course.

## IACET CREDITS



EUCI has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this accreditation, EUCI has demonstrated that it complies with the ANSI/IACET Standard which is recognized internationally as a standard of good practice. As a result of their Authorized Provider status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard.

**EUCI is authorized by IACET to offer 1.0 CEUs for the course and 0.4 CEUs for the workshop.**

## ONLINE COURSE DELIVERY & PARTICIPATION DETAILS

We will be using Microsoft Teams to facilitate your participation in the upcoming event. You do not need to have an existing Teams account in order to participate in the broadcast – the online course will play in your browser and you will have the option of using a microphone to speak with the room and ask questions, or type any questions in via the chat window and our on-site representative will relay your question to the instructor.

- You will receive a meeting invitation which will include a link to join the meeting.
- Separate meeting invitations will be sent for the morning and afternoon sessions of the online course.
  - o You will need to join the appropriate meeting at the appropriate time.
- If you are using a microphone, please ensure that it is muted until such time as you need to ask a question.
- The remote meeting connection will be open approximately 30 minutes before the start of the online course. We encourage you to connect as early as possible in case you experience any unforeseen problems.

## REQUIREMENTS FOR SUCCESSFUL COMPLETION

You must be logged in for the entire presentation and send in the evaluation after the online course is completed.

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# PLEASE SELECT

**BUNDLE PRICE: COST ESTIMATING METHODOLOGIES FOR SUBSTATION AND TRANSMISSION PROJECTS COURSE AND POST COURSE WORKSHOP:** COST ESTIMATING 201  
SEPTEMBER 17-18, 2020: US \$1,595 (Single Connection)

**PACK OF 5 CONNECTIONS:** US \$7,175

**PACK OF 10 CONNECTIONS:** US \$11,965

**COST ESTIMATING METHODOLOGIES FOR SUBSTATION AND TRANSMISSION PROJECTS COURSE ONLY:**  
SEPTEMBER 17-18, 2020: US \$1,195 (Single Connection)

**PACK OF 5 CONNECTIONS:** US \$5,375

**PACK OF 10 CONNECTIONS:** US \$8,965

**POST COURSE WORKSHOP ONLY:** COST ESTIMATING 201  
FRIDAY, SEPTEMBER 18, 2020: US \$495 (Single Connection)

**For volume discounts call +1.303.770.8800 for quote**

*\* all other discounts do not apply to license packs*

# REGISTRATION INFO

## Mail Directly To:

EUCI  
6400 S Fiddlers Green Cir., Suite 1620  
Greenwood Village, CO 80111  
OR, scan and email to: [conferences@euci.com](mailto:conferences@euci.com)

**WWW.EUCI.COM**

**p: 303-770-8800**

**f: 303-741-0849**

## Online Course Delivery & Participation Details

*See page 8 for information*

How did you hear about this event?  
(direct e-mail, colleague, speaker(s), etc.)

Print Name		Job Title	
Company			
Address			
City	State/Province	Zip/Postal Code	Country
Phone		Email	

## CREDIT CARD INFORMATION

Name on Card		Billing Address	
Account Number		Billing City	Billing State
Exp. Date	Security Code (last 3 digits on the back of Visa and MC or 4 digits on front of AmEx)	Billing Zip Code/Postal Code	

**OR** Enclosed is a check for \$ \_\_\_\_\_ to cover \_\_\_\_\_ registrations.

### Substitutions & Cancellations

Your registration may be transferred to a member of your organization up to 24 hours in advance of the event. Cancellations must be received on or before August 21, 2020 in order to be refunded and will be subject to a US \$195.00 processing fee per registrant. No refunds will be made after this date. Cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event. This credit will be good for six months from the cancellation date. In the event of non-attendance, all registration fees will be forfeited. In case of course cancellation, EUCI's liability is limited to refund of the event registration fee only. For more information regarding administrative policies, such as complaints and refunds, please contact our offices at 303-770-8800.

EUCI reserves the right to alter this program without prior notice.

