



PG&E ENERGY CENTERS FALL 2019 PREVIEW

Classes and resources to help you gain new skills and fuel your future



pge.com/energycenterclasses

This year open more doors with help from PG&E Energy Centers

We want to inspire and empower you to save energy in the buildings and equipment you design, renovate, build and maintain.

That's why we offer a diverse set of free energy education resources to help expand your knowledge and skills. Get hands-on training and technical design expertise to better compete in today's energy workforce and building market. Grow your network by meeting others in the industry. Just as importantly, create opportunity for higher energy savings and better performance for your business and your customers.

Benefit from:

- In-person training at multiple locations on a broad range of energy efficiency topics
- Web-based training, including on-demand classes, simulcasts and webinars
- Expert consultations for your energy-related projects
- An extensive tool lending library of more than 5,400 energy management tools
- Interactive tours of our Zero Net Energy home



Where to find us

Pacific Energy Center

851 Howard Street
San Francisco, CA 94103

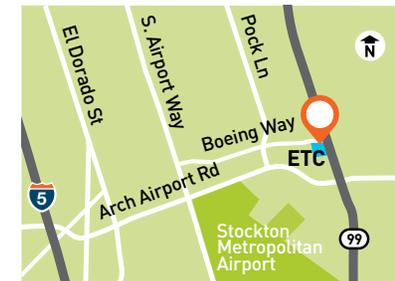
 415-973-2277
energycenters@pge.com



Energy Training Center

3136 Boeing Way
Stockton, CA 95206

 1-800-244-9912
energycenters@pge.com



Food Service Technology Center

12949 Alcosta Boulevard
San Ramon, CA 94583

 1-800-398-3782
fstc@frontierenergy.com



Energy Efficiency in Food Service

The Food Service Technology Center (FSTC) provides energy efficiency training and technical advice to the commercial food service industry. Restaurant owners and operators, institutional food service providers, cooking equipment manufacturers and kitchen designers look to the FSTC to provide unbiased, comprehensive information about energy use and efficiency. The FSTC provides an array of services, including:

- Try-Before-You-Buy equipment demonstrations
- Kitchen equipment test reports
- Design consultation services
- On-site food service facility surveys
- Educational seminars
- Equipment testing services

Upcoming Fall Classes

Sept 26

Go with the Flow

Efficient and Effective Dish Room Pre-Rinse Operations

Oct 17

Cook, Hold and Chill

Equipment and Techniques that Save Energy, Reduce Waste and Cut Labor Costs

Nov 19

Putting the Kitchen of the Future to the Test

Real Stories from the Frontline of Equipment Efficiency

To learn more about the FSTC, and food service rebates and incentives, visit pge.com/foodservice.

New On-Demand Courses

We're excited to announce the launch of five new on-demand courses. Check them out amongst our 40+ courses. These web-based, self-paced classes let you learn at your own speed and on your schedule.

New Classes

- Zero Net Energy Introduction and Project Showcase
- Heat Pump Technologies for Space Conditioning and Water Heating
- Automation, EMS Systems and PLCS
- 2019 Title 24 Non-residential Updates
- 2019 Title 24 Residential Updates

Go to pge.com/energycenterclasses and select "On Demand" button.

After Hours Education

Hear from and interact with thought leaders shaping the culture of sustainability and energy efficiency. Evening lectures pose thought provoking questions and encourage an exchange of ideas.

Pacific Energy Center, San Francisco

Doors open at 5:30 p.m. for networking, hors d'oeuvres and beverages.

Lectures and activities begin at **6 p.m.**

Upcoming Fall Evening Events

Sept 12

Are LED Outdoor Lights Causing Light Pollution?

Naomi Miller from Pacific Northwest National Laboratory discusses LED street lighting's impact on the night sky. She assesses causes and economics of increased nighttime lighting and poses solutions for the future.

Oct 10

Energy Center Game Night II

Assemble a group and join us for a night of learning, socializing and fun. This event features teams of participants working together to answer energy-related questions. Accolades and admiration will be awarded to the team with the highest final score.

Nov 14

Current Trends in Daylighting

University of Oregon School of Architecture faculty member Kevin Van Den Wymelenberg discusses how daylight is being incorporated into buildings for greater occupant well-being, productivity and energy efficiency.

Dec 5

Tales from 25 Years of Lending Building Measurement Tools

The PG&E tool lending library turns 25 this year. Hear about the genesis of the tool lending library from Cris Benton who conceived of the program, and enjoy insights on innovative use of our tools from the Energy Center's Ryan Stroupe and several borrowers.

Go to pge.com/energyclasses and enter class name then click filter.



Building Envelope

Integrated Design for Non-residential and Multi-Unit Residential: Overcoming Design and Management Challenges

Regardless of delivery method, a collaborative design/construction team can result in buildings that have greater value to an owner. Learn how to increase durability, improve environments for occupants, use less energy and reduce greenhouse gas emissions. Staff from Integral Group discusses strategies that support a successful integrated design/construction process.

SKILL LEVEL 1
September 10 • Webinar only

Integrated Design Process: Project Goals and Metrics—How to Establish Them, Assess Success and Keep on Track

This webinar on Integrated Design focuses on setting goals and measuring and tracking progress. Presenters describe the role of the Owner's Project Requirements (OPR) and Basis of Design (BOD) documents and review metrics to assess energy performance.

SKILL LEVEL 1
October 8 • Webinar only

Air and Moisture Control in Commercial Buildings

In this one-day intensive training from the Air Barrier Association, learn topics like building science; air barrier materials, specifications and details; and installation practices.

SKILL LEVEL 2
October 16 • PEC, San Francisco



Integrated Design for Non-residential and Multi-Unit Residential: Projects of All Sizes and Delivery Methods

This webinar on Integrated Design presents three case studies of successful projects with varying delivery methods. Presenters describe challenges, what works and how best to leverage the knowledge and experience of each team member.

SKILL LEVEL 1
November 12 • Webinar only

Integrated Design for Non-residential and Multi-Unit Residential: How to Use Whole-Building Performance Energy Targets During Design

This session covers how to use whole-building energy performance targets throughout a building's design, construction and operations. Presenters discuss how to develop benchmark equivalent values, how to set a building energy performance target prior to design, and how to integrate energy modeling throughout the design process.

SKILL LEVEL 1
December 10 • Webinar only

Zero Net Energy Introduction and Project Showcase

Welcome to the future. We are excited to support you as a catalyst for change with this introduction to the concepts and principles of Zero Net Energy (ZNE). In this project showcase you explore ZNE basics and review case studies that highlight the impact that the ZNE building is making today.

SKILL LEVEL 1
On Demand

We offer more than 100 unique classes each year. Go to pge.com/energycenterclasses for a complete list of our fall 2019 classes.

LOCATIONS:
Pacific Energy Center (PEC)
851 Howard Street
San Francisco, CA 94103
Energy Training Center (ETC)
3136 Boeing Way
Stockton, CA 95206

SKILL LEVELS:
1 Introductory
2 Intermediate
3 Advanced



Lighting

Lighting Fundamentals

This overview of lighting topics includes terminology, human vision, color theory, electric light sources, fixtures and calculations. Demonstrations in the lighting classroom provide visual experiences with color temperature and color rendering, light measurement and visual response.

SKILL LEVEL 1
September 12 • PEC, San Francisco

How to Write the Owner's Project Requirements (OPR) and a Basis of Design (BOD) for Lighting Controls

In this class learn to develop and write two important lighting and controls documents, the OPR and BOD, to provide a basis for an efficient and maintainable system. Participants learn to document requirements for lighting/lighting controls in the OPR. Once the OPR is completed, participants use it to complete the first two sections of a BOD in order to make sure the design vision is realized while providing an efficient and maintainable system.

SKILL LEVEL 2
October 8 • PEC, San Francisco
Online Simulcast

How to Prepare a Control Intent Narrative (CIN) and Sequence Of Operations (SOO) for Advanced Lighting Controls

This class follows the initial Basis of Design and explains how to prepare a CIN. Both documents help determine the SOO, which establishes operating parameters and set points for the control system, ensuring it is programmed properly and enforceable through testing.

SKILL LEVEL 2
October 8 • PEC, San Francisco
Online Simulcast

Best Practices for Lighting Retrofits

This training teaches how to approach lighting retrofit opportunities including selecting luminaires and lighting control systems to achieve an effective, quality upgrade. Participants learn to take into account existing conditions such as available daylight due to location and building orientation, reflectances and workplace design to realize deeper energy savings.

SKILL LEVEL 1
October 15 • PEC, San Francisco
Online Simulcast



0-10V vs. DALI Dimming—Using the Right Lighting Control Protocol for Your Project

An in-depth look at both 0-10V and DALI dimming controls explains how their features and characteristics differ, and under what circumstances each can be successfully specified. The class includes an opportunity to handle, wire and operate both types of dimming products.

SKILL LEVEL 2
October 22 • PEC, San Francisco

Case Studies of Advanced Lighting Controls: Learning from Exemplary Projects-2019 Update

This course presents recently completed case study projects that demonstrate best practices in designing, implementing and operating ALCS. The course addresses task tuning, color tuning, designing for ZNE, successful integrated design approaches, assessing technologies and systems and calculating ROI.

SKILL LEVEL 2
October 28 • PEC, San Francisco

Agricultural/Industrial



Automation, EMS Systems and PLCs

This on-demand training introduces the participant to the basics of Programmable Logic Controllers (PLCs). It also explores examples and benefits of automating processes through PLCs.

SKILL LEVEL 1
On Demand



Integrated Demand Side Management



Basics of Solar Electric Systems

Did you know that solar is the fastest-growing energy technology? Get the basics of photovoltaics (PV) in a convenient on-demand format. This course is ideal for people who are curious or thinking about going solar themselves.

SKILL LEVEL 1
On Demand

PV + Batteries

This course covers the latest in battery technology including how batteries of various sizes are integrated into PV systems. Instructors cover basic concepts, design criteria and financial implications. They also outline various ways batteries can improve PV output and deliver benefits to the utility grid.

SKILL LEVEL 2
October 22 • PEC, San Francisco
Online Simulcast

PV Site Analysis

This is an intermediate class for anyone interested in understanding the specific issues associated with PV site analysis and system sizing. Participants are expected to have an understanding of PV basics and will learn about tools for solar site analysis (Solar pathfinder, Solmetric SunEye) through hands-on demonstrations, field exercises and project examples.

SKILL LEVEL 2
September 25 • PEC, San Francisco

Inspecting PV Systems for Code Compliance

In this advanced class, the instructor covers in detail issues pertaining to permissions and inspections of PV grid-tied systems in all sectors, including commercial, industrial, small business, multifamily and residential.

SKILL LEVEL 3
November 7 • PEC, San Francisco
Online Simulcast

Demand Response: Basic Concepts, Programs, and Site Assessment

Demand Response (DR) can be a significant part of the energy picture for many commercial and industrial facilities and an important way to lower energy costs. This class covers the basic concepts that building owners and facilities managers need to know to determine if and how DR might be applied to their building(s).

SKILL LEVEL 1
October 8 • PEC, San Francisco
Online Simulcast

PG&E Rates and Tariffs

This class focuses on the basics of how energy is metered and priced, including rates and tariffs, time-of-use, demand charges, peak day pricing (PDP), power factor adjustments and net energy metering (NEM). It covers electrical and gas rates for both residential and commercial buildings.

SKILL LEVEL 1
December 5 • PEC, San Francisco
Online Simulcast

Existing Facilities



Basic Excel for Energy Auditors

The bulk of this hands-on training covers the following topics: navigation in excel, keypad short cuts, formatting data, creating graphs and calculations/formulas. Instructors use common energy audit applications for exercises and examples. More advanced capabilities of the software, including regressions, pivot tables and macros are introduced at the end of this class.

SKILL LEVEL 1
September 19 • PEC, San Francisco
Online Simulcast

HVAC Fundamentals: New Ideas for Novices

Using equipment samples, in-class activities and other interactive teaching techniques this class introduces mechanical system concepts to building professionals with little or no experience in this area. Topics include thermal comfort, heat transfer, load calculations, psychrometrics, mechanical system components and systems, low-energy strategies, control systems, code compliance and building commissioning.

SKILL LEVEL 1
October 29-30 • PEC, San Francisco

Logic Diagrams and Control Sequences

Control logic diagrams are critical design and diagnostic tools. This class explores techniques to develop logic diagrams. A workshop applies the concepts using teams of attendees to develop diagrams for various PEC systems.

SKILL LEVEL 2
November 13 • PEC, San Francisco
Online Simulcast

Universal Translator (UT3) Workshop: Software Demonstration and Interactive Lab

This course is intended for building professionals interested in learning to use the PEC's UT3 software tool. UT3 is designed for the management and analysis of data from loggers and of trends from building management systems. The tool provides significant time savings to professionals tasked with managing large data sets, performing data diagnostics or verifying energy savings from existing building or new construction projects.

SKILL LEVEL 2
November 21 • PEC, San Francisco
Online Simulcast

Power, Energy and Therms: Fundamental Concepts, Monitoring Techniques and Load Disaggregation

In energy efficiency and load management projects, it is important to understand which equipment in the facility is the greatest contributor to energy use, peak demand and utility costs. This class explores methods to identify significant electric and natural gas loads using utility meters, submeters, dataloggers and building control systems. Participants learn the application of power meters to better understand energy efficiency, demand response and renewable energy projects.

SKILL LEVEL 2
December 4 • PEC, San Francisco

Energy Audit Skills: Tools, Data Collection Techniques and Calculations

This training allows attendees to develop several specific energy reduction projects from conception to financial benefit analysis. This one-day program, which serves as a hands-on follow-up to PG&E's (3-Day) Energy Auditing Techniques for Small and Medium Commercial Facilities class, focuses on energy and cost calculations, data collection and billing data analysis.

SKILL LEVEL 2
October 4 • PEC, San Francisco

Graphic Representation of Data: Making Charts that Matter

Using data from the fields of energy efficiency and building performance, participants create compelling and easy-to-understand data graphics through in-class exercises. Instructors share best practices and dissect several graphic successes and failures. This training also explores advantages and disadvantages of various representation options and identifies the appropriate application of specific chart types.

SKILL LEVEL 2
October 18 • PEC, San Francisco
Online Simulcast

Model Water Efficient Landscape Ordinance (MWELO) and the New Normal for California Landscaping

This training, developed through a partnership between StopWaste (stopwaste.org) and PG&E, includes an expansive look at the ordinance and explores an array of design strategies that meet the standard. Speakers include two landscape designers, an irrigation specialist, a code reviewer and a compost specialist. Interactive design activities are included where participants apply the concepts covered.

SKILL LEVEL 1
November 6 • PEC, San Francisco
Online Simulcast

Energy Audit Report Writing Workshop: Conveying Value to Customers

This training is intended for graduates of the PEC's three-day Audits and Audit Skills training. It focuses on the only auditor task not already covered by existing PEC classes: writing the audit report. Using templates, calculators and sample audit reports, this hands-on workshop teaches participants to author a complete and professional energy audit report.

SKILL LEVEL 2
November 8 • PEC, San Francisco
Online Simulcast

We offer more than 100 unique classes each year. Go to pge.com/energycenterclasses for a complete list of our fall 2019 classes.



Home Performance

Air Sealing to Achieve Zero Net Energy—New Techniques and Applications

Methods to incorporate air sealing into a building's design and construction are presented using field examples, different types of sealants and hands on props.

SKILL LEVEL 2
October 2 • ETC, Stockton
Online Simulcast

How to Design and Build High Performance Walls and Roofs

This interactive class is designed to sort through the myriad insulation system options to match the best system to the structure type.

SKILL LEVEL 2
October 15 • ETC, Stockton
Online Simulcast

Window Selection for New and Existing Homes

Learn to evaluate and select the most appropriate window technology for California climates to save on heating and cooling costs and increase occupant thermal comfort.

SKILL LEVEL 2
October 16 • PEC, San Francisco
Online Simulcast

Optimizing Residential HVAC System Performance

This class focuses on optimizing the performance of central forced-air heating and cooling systems in existing single-family residential buildings.

SKILL LEVEL 2
October 23 • ETC, Stockton
Online Simulcast

High Performance Crawl Spaces: A Practical Approach to Air Sealing and Insulating

This class explains how to apply building science principles to crawl spaces. Topics include moisture management, installation and maintenance of air and thermal control layers.

SKILL LEVEL 3
November 19 • ETC, Stockton
Online Simulcast

Heat Pump Technologies for Space Conditioning and Water Heating

This class provides an overview of electric heat pumps for space and water heating, ducted and ductless systems, air-source, ground-source and water-source. It covers technology and operation, efficiency and metrics, advantages and disadvantages and optimal installation factors.

SKILL LEVEL 1
On Demand



BPI Combustion Safety and Depressurization

This class provides instructor-supervised hands-on practice with BPI-specific combustion safety protocols needed to prepare for the Building Analyst field test.

SKILL LEVEL 2
November 20 • ETC, Stockton





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Expert Consultations