PG&E ENERGY CENTERS SPRING 2018 PREVIEW

Classes and resources to help you gain a competitive edge

pge.com/energyclasses

Open more doors in 2018 with help from PG&E Energy Centers

At PG&E Energy Centers, we want to inspire and empower you to save energy in the buildings and equipment you design, build and maintain.

That's why we offer a wealth of free energy education resources to help expand your skills and expertise, whether you're a contractor, designer, architect or business owner. 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
- Interactive labs for learning and project support
- A robust tool lending library of 5,700+ energy management tools

What this means to you

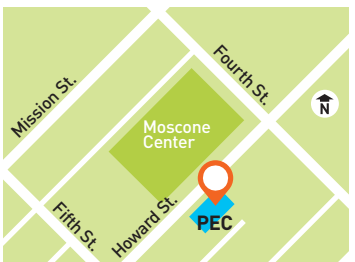
Get the active training and technical design know-how to compete in today's energy workforce and building market. Grow your network by meeting others in the industry and—just as importantly—create opportunity for higher energy savings and better performance for your business and your customers.

Get inspired for the year ahead by looking at our 2018 spring schedule now.

Where to find us

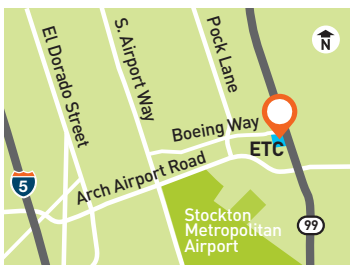
Pacific Energy Center
851 Howard Street
San Francisco, CA 94103

415-973-2277
Fax: 415-896-1290



Energy Training Center
3136 Boeing Way
Stockton, CA 95206

1-800-244-9912
209-955-7300
Fax: 209-955-7320

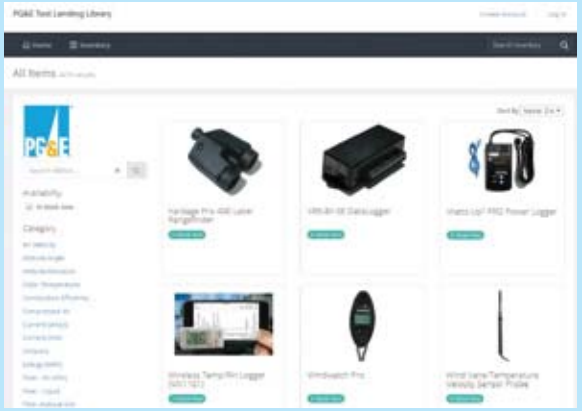


Expert-led training on your terms

On-Demand Classes

Our new, on-demand classes bring the classroom to you. These web-based, self-paced classes let you learn at the speed that's best for you and on your schedule. Choose from 30+ classes on topics ranging from air conditioning to zero net energy.

Go to **pge.com/energyclasses** and select "On-Demand" button.



Tool Lending Library

Are there times when it's tough to get a job done because you don't have the right tool? Not anymore. We've invested more than $1 million to acquire tools professionals like you use on energy efficiency projects—and you can borrow them for free. Find over 5,700 tools and accessories, along with detailed usage notes, in our online catalog.

Visit our Tool Lending Library at **pge.com/tools**

Simulcasts and Webinars

We understand it's not always easy to attend in-person classes. That's why we live-stream many of them, so you can join from anywhere using an internet-enabled device.

To find these classes, go to **pge.com/energyclasses** and select "Internet" as the location.

Expert Consultations

Need to solve a specific issue with an energy-related project? Talk with our in-house experts to learn what you need (classes, tools, etc.) to resolve it. Email **energycenters@pge.com** for help.

Interactive Labs

Our facilities feature models and simulations to support hands-on learning. Email **energycenters@pge.com** to book a tour.

PG&E ENERGY CENTERS SPRING 2018

Take a class. Advance your career. Grow your business.

LOCATIONS:

PEC, San Francisco
851 Howard Street

ETC, Stockton
3136 Boeing Way

SKILL LEVELS:

1 Introductory
2 Intermediate
3 Advanced

Building Envelope

Passive Building—A Path to Zero: Principles, Standards & Local Case Study

A variety of presenters introduce passive building standards, principles and North American examples and will describe collaborative efforts between Passive House Institute U.S. (PHIUS) and the US Department of Energy's Zero Energy Ready Home (ZERH) program. Energy modeling and cost-optimization opportunities are discussed along with two in-depth case studies of residential projects, including a 4-unit building.

SKILL LEVEL 1
February 2018 • PEC, San Francisco

Title 24 Part 6 Essentials—Nonresidential Standards Essentials for Architects

This hands-on class is designed to provide architects with the knowledge and skills needed to navigate key nonresidential Title 24, Part 6 building standards and compliance options and related documents for new construction, alterations and additions.

SKILL LEVEL 1
March 2018 • PEC, San Francisco

Building Science Principles and Practice for Nonresidential Enclosures

This on-demand class offers a working definition of building science and explains why building design professionals need to understand it.

SKILL LEVEL 1
On-Demand

Air-Sealing for an Efficient New Home

This on-demand class is divided into three sections: (1) why we need to air seal new homes—the building science; (2) how we air seal new homes—the techniques; and (3) how we measure our success—quality control using a blower door and infrared camera.

SKILL LEVEL 1
On-Demand

The Building as a System

This on-demand class combines building science fundamentals with the specifics of building materials and assemblies, demonstrating that the components of energy-efficient buildings work in harmony with each other to provide a safe, comfortable and economical habitat.

SKILL LEVEL 1
On-Demand

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Lighting

Lighting Fundamentals

This class uses the Pacific Energy Center's Lighting Classroom to provide visual experiences of lighting terminology, vision, light and color theory, electric light sources, fixtures, controls and calculations.

SKILL LEVEL 1
February 2018 • PEC, San Francisco

Best Practices for Lighting Audits

This interactive class covers energy audits of lighting systems. Exercises include documenting the number and type of fixtures, light sources, light levels, hours of operation, and controls. Participants learn to suggest lighting layout changes and use audit results to assess the savings potential of various efficiency measures before implementation.

SKILL LEVEL 1
February 2018 • PEC, San Francisco

Advanced Lighting Control Systems: Hands-On Workshop

This class introduces four Advanced Lighting Control Systems to participants via collaborative activities. Demonstrations include wired and wireless, 0–10 volt dimming, single and multi-function sensors as well as room-based and network based control systems.

SKILL LEVEL 1
February 2018 • PEC, San Francisco

The Science and Application of Circadian Lighting

This class covers how electric light contributes to circadian entrainment as well as techniques to take advantage of recent scientific research. The class also provides insight into existing standards used in the industry.

SKILL LEVEL 3
February 2018 • PEC, San Francisco

How to Prepare a Lighting Control Intent Narrative and Sequence of Operations for Advanced Lighting Control Systems

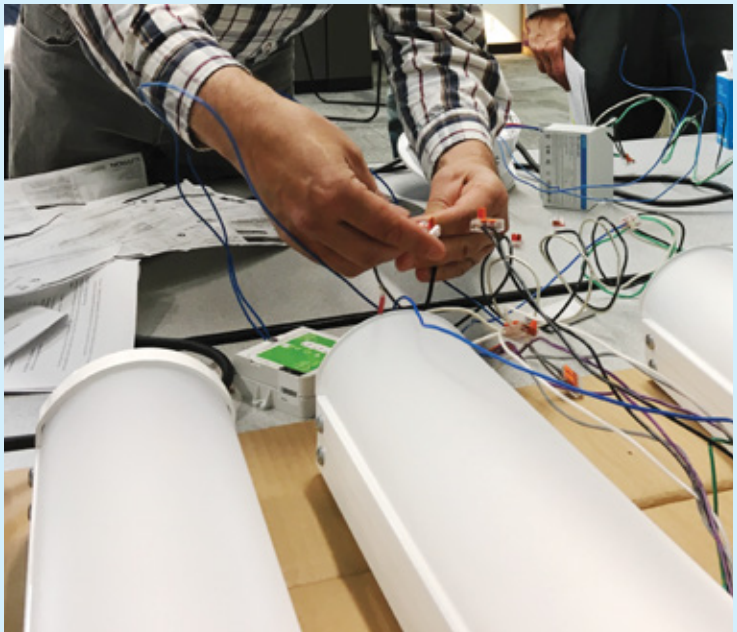
This class instructs participants to create an advanced Lighting Control Systems Sequence of Operations and a Control Intent Narrative. The class addresses energy codes, occupancy, scheduling, daylight harvesting and demand response.

SKILL LEVEL 2
March 2018 • PEC, San Francisco

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

Participants learn to document lighting and controls in the OPR and BOD for an efficient, maintainable system. Presenters discuss what makes a good OPR and the information that should be included.

SKILL LEVEL 2
March 2018 • PEC, San Francisco



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Existing Facilities

Airside Economizer: Design, Performance and Commissioning

This class covers airside economizers with an emphasis on how proper operation can significantly reduce a building's mechanical cooling requirement and thus its energy consumption. Related topics such as design review, commissioning, maintenance and costs are illustrated by case studies.

SKILL LEVEL 2
February 2018 • PEC, San Francisco

Energy Auditing Techniques for Small and Medium Commercial Facilities

During this three-day workshop, instructors focus on the audit process and foster attendees' ability to identify energy efficiency, demand response, and operations and maintenance opportunities in existing facilities. The training includes hands-on activities and a mock energy audit.

SKILL LEVEL 1
March 2018 • PEC, San Francisco

Basic Excel for Energy Auditors

This hands-on training covers Microsoft Excel fundamentals, including navigating the program, key-pad shortcuts, formatting data, creating graphs and calculations (formulas). In-class exercises and examples integrate common energy audit applications. More advanced capabilities of the software, including regressions, pivot tables and macros are covered at the end of class.

SKILL LEVEL 2
March 2018 • PEC, San Francisco

Graphic Representation of Data: Making Charts that Matter

This training is intended to help participants make compelling and easy-to-understand data graphics. Instructors share data representation best practices and dissect a number of graphic successes or failures using data from the energy efficiency and building performances fields.

SKILL LEVEL 2
March 2018 • 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 class serves as a hands-on follow-up to PG&E's (3-day) Energy Auditing Techniques for Small and Medium Commercial facilities class, focusing on energy and cost calculations, data collection, and monitoring equipment.

SKILL LEVEL 2
March 2018 • PEC, San Francisco

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Home Performance

Electric Heat Pumps for Domestic Space and Water Heating: Applications and Considerations

This class focuses on efficiency gains and emissions reductions from electric heat pumps, including the advantages and limitations of these systems, available technology and refrigerant types. It provides an overview of electric heat pumps for space heating and water heating, including their interactions with the building enclosure and other systems.

SKILL LEVEL 1
February 2018 • ETC, Stockton

Advanced Framing for Energy and Resource Efficiency

Advanced framing can reduce material and labor costs as well as construction waste and can enable improved occupant comfort, even with smaller HVAC systems. This class covers advanced design and construction methods for optimizing wood-framed building enclosures. It is ideal for architects, designers, engineers and builders seeking to overcome common obstacles when implementing advanced framing in low-rise residential and small commercial buildings.

SKILL LEVEL 3
January 2018 • ETC, Stockton

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

This class uses real-world examples to provide an understanding of the importance of air sealing, how to incorporate air sealing into building design and construction, and the materials and techniques most effective at tightening the building envelope.

SKILL LEVEL 2
January 2018 • PEC, San Francisco
March 2018 • ETC, Stockton

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

This class focuses on applying building science principles to California crawl spaces. Topics address moisture management, air and thermal control layers, converting vented crawl spaces to unvented and conditioned crawl spaces, control strategies that promote building durability, and techniques for drying wet crawl spaces.

SKILL LEVEL 3
February 2018 • ETC, Stockton

Combustion Safety and Depressurization

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

SKILL LEVEL 2
March 2018 • ETC, Stockton

Residential Energy Auditing

An energy audit is your client's roadmap to improve an existing building's energy efficiency. This on-demand class offers a broad scope because an energy auditor must understand all the building's energy-related components.

SKILL LEVEL 1
On-Demand

Best Practices in Residential Water Heating

This on-demand class focuses on "hot water as a system" in both new and existing residential applications. Topics include water heaters, piping, hot water outlets, drainwater heat recover and integration with solar thermal systems.

SKILL LEVEL 1
On-Demand

Energy Efficient Windows

Most people don't understand the importance of windows and the many features that affect window choices for new and existing buildings. This on-demand class focuses on window economics. We also present an extensive discussion of the factors that determine window energy performance.

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Heating, Ventilation and Air Conditioning (HVAC)

These mechanical systems provide thermal comfort and air quality in indoor spaces.

Title 24 Proper Procedures for Charging Air Conditioners and Heat Pumps

This class provides hands-on training and exercises covering the Title 24 methods for checking charge and measuring air flow for residential and small commercial air conditioners and heat pumps. Portable AC and heat pump props are used in hands-on learning.

SKILL LEVEL 2
February 2018 • **ETC, Stockton**

Air Conditioning Contractors of America Design Series (ACCA Manuals J, D, S and T)

Are you a square foot per ton kind of person when it comes to sizing HVAC systems? Heating and cooling systems should be sized to the loads they are serving. This class covers how to use the ACCA approved Wrightsoft Right Suite® software program to more accurately match the HVAC systems you are installing or replacing to the loads in residential buildings. ACCA Manual J (sizing the equipment), Manual D (duct design), Manual S (equipment selection) and Manual T (terminal selection) will be utilized throughout.

SKILL LEVEL 2
February 2018 • **ETC, Stockton**

Demand Control Ventilation and Variable Speed Fans

In order to better control commercial buildings during occupied periods and comply with Title 24 code requirements, this class provides participants with a full understanding of demand control ventilation (DCV) and variable speed fan control strategies. PG&E rebates are also addressed, as they apply to DCV and variable speed fan control.

SKILL LEVEL 3
January 2018 • **ETC, Stockton**

ACCA (Air Conditioning Contractors of America) Residential Quality Installation Series

This on-demand series consists of 12 modules designed as a whole to provide the student with an introduction and orientation to designing high-quality residential HVAC systems.

SKILL LEVEL 1
On-Demand

Home Heating and Cooling Basics

The purpose of this on-demand class is to help participants identify various types of heating and cooling equipment. Lessons discuss how the equipment works and the functions of the major components of electrical and gas heating equipment.

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Integrated Demand Side Management

Financing Fundamentals for Energy Projects

This class covers all the financial terms, definitions and processes involved in assessing and bidding energy projects, including energy efficiency and renewables.

SKILL LEVEL 1
February 2018 • PEC, San Francisco

Basics of Photovoltaic (PV) Systems for Grid-Tied Applications

This class teaches the basic vocabulary, technical details and economic concepts necessary to understand and evaluate grid-connected photovoltaic (PPV) projects. It is an ideal foundation for anyone new to the industry and is the basis for more advanced classes in our PV series.

SKILL LEVEL 1
February 2018 • PEC, San Francisco

Photovoltaic (PV) Site Analysis and System Sizing

This class will assist participants in evaluating the technical feasibility of a potential PV project, including estimation of available solar resource, system orientation, module tilt angles, planning for shade and evaluating space requirements. Tools relevant to site analysis and sizing are introduced.

SKILL LEVEL 2
February 2018 • PEC, San Francisco

Heat Pumps: Residential Applications and Comparison with Solar Energy Systems

This class covers all aspects of heat pumps, including the fundamentals of the technology, site analysis, system design and cost factors and cost compares them with renewable energy systems.

SKILL LEVEL 2
March 2018 • PEC, San Francisco

Basics of Solar Electric Systems

This on-demand class is a high-level overview of the basic concepts of grid-tied solar electric systems. It is ideal for people who are new to solar, those who are familiar but want to broaden their scope and homeowners who are considering going solar.

SKILL LEVEL 1
On-Demand

Electric Vehicles (EVs): What You Need to Know

This on-demand class is a high-level overview of electric vehicles (EVs) and includes description and operation, costs and maintenance, charging and rates and environmental impacts. The topic is all-electric vehicles, not hybrids.

SKILL LEVEL 1
On-Demand

Gain the energy-efficiency skills and expertise companies and customers are looking for in the year ahead.
Enroll in a no-cost Energy Center class today. Go to **pge.com/energyclasses** for a complete list of classes.