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June 15, 2021

Advice No. 5821
(Southern California Gas Company – U 904 G)

Advice No. 4552-G/6225-E
(Pacific Gas & Electric Company – U 39 M)

Advice No. 4520-E
(Southern California Edison Company – U 338 E)

Advice No. 7-E/6-G
(Tri-County Regional Energy Network)

Public Utilities Commission of the State of California

Subject: 2022 Joint Cooperation Memorandum (JCM) of SoCalGas, SCE, 3C-REN, and PG&E Pursuant to Decision (D.) 18-05-041

Purpose

Southern California Gas Company (SoCalGas), on behalf of Southern California Edison Company (SCE), Tri-County Regional Energy Network (3C-REN) and Pacific Gas & Electric Company (PG&E) hereby submits to the California Public Utilities Commission (Commission or CPUC) the 2022 JCM, as shown in Attachment A, pursuant to Ordering Paragraph (OP) 38 of Decision (D.) 18-05-041.

Background

On June 5, 2018, the Commission issued D.18-05-041 which adopted the Energy Efficiency Business Plans of Investor-Owned Utilities (IOUs) and Non-IOU Program Administrators (PAs) for the years between 2018 and 2025. D.18-05-041 acknowledged the potential overlaps between IOU PAs and non-IOU PAs and directed PAs with overlapping service areas to submit annual JCMs that show how the PAs would avoid or minimize duplication for programs that address a common

sector in overlapping service territories. Specifically, OP 38 of D.18-05-041 directed the IOU PAs and Non-IOU PAs to submit their first annual JCMs for approval via Tier 2 Advice Letters (AL) no later than August 1, 2018, and subsequent annual JCMs for approval via Tier 2 ALs no later than June 15 prior to submitting their Annual Budget Advice Letters (ABAL).

2022 Joint Cooperation Memo

Attachment A of this AL contains the 2022 JCM between SoCalGas, SCE, 3C-REN, and PG&E. The JCM provides (1) a summary of 3C-REN's program compliance with D.12-11-015; (2) a summary of the IOU PAs' 2022 comparable program offerings, if applicable; (3) a summary of all the programs 3C-REN intends to run and indicates which programs may overlap with SoCalGas, SCE, and PG&E; and (4) a summary of the coordination efforts between 3C-REN, SoCalGas, SCE, and PG&E.

The Joint PAs make note that the budgets and programs outlined in this memo are the best estimates of 2022 offerings at the time of submittal and are not assumed to be approved. Programs and budgets will be reviewed and approved as part of the ABAL.

Protests

Anyone may protest this AL to the Commission. The protest must state the grounds upon which it is based, including such items as financial and service impact, and should be submitted expeditiously. The protest must be made in writing and received within 20 days of the date of this AL, which is July 5, 2021. The address for mailing or delivering a protest to the Commission is:

CPUC Energy Division
Attn: Tariff Unit
505 Van Ness Avenue
San Francisco, CA 94102

A copy of the protest should also be sent via e-mail to the attention of the Energy Division Tariff Unit (EDTariffUnit@cpuc.ca.gov). Due to the COVID-19 pandemic and the shelter at home orders, SoCalGas is currently unable to receive protests or comments to this AL via U.S. mail or fax. Please submit protests or comments to this AL via e-mail to the addresses shown below on the same date it is mailed or e-mailed to the Commission.

For SoCalGas:

Attn: Ray B. Ortiz
Tariff Manager - GT14D6
555 West Fifth Street
Los Angeles, CA 90013-1011
Facsimile No.: (213) 244-4957
E-mail: ROrtiz@socalgas.com
E-mail: Tariffs@socalgas.com

For SCE:

Shinjini C. Menon
Managing Director, State Regulatory Operations
Southern California Edison Company
8631 Rush Street
Rosemead, CA 91770
Telephone: (626) 302-3377
Facsimile: (626) 302-6396
E-mail: AdviceTariffManager@sce.com

And

Tara S. Kaushik
Managing Director, Regulatory Relations
c/o Karyn Gansecki
Southern California Edison Company
601 Van Ness Avenue, Suite 2030
San Francisco, CA 94102
Facsimile: (415) 929-5544
E-mail: Karyn.Gansecki@sce.com

For 3C-REN:

Susan Hughes
Senior Deputy Executive Officer
Ventura County
800 S. Victoria Avenue
Ventura, CA 93009
Telephone: (805) 654-3836
Facsimile: (805) 654-5106
E-mail: Susan.Hughes@ventura.org

For PG&E:

Erik Jacobson
Director – Regulatory Relations
c/o Megan Lawson
Pacific Gas and Electric Company
77 Beale Street, Mail Code B13U
P.O. Box 770000
San Francisco, CA 94177
Facsimile: (415) 973-3582
E-mail: PGETariffs@pge.com

Effective Date

SoCalGas believes this submittal is subject to Energy Division disposition and should be classified as Tier 2 (effective after staff approval) pursuant to General Order (GO) 96-B. SoCalGas respectfully requests that this submittal be approved on July 15, 2021, which is 30 calendar days from the date submitted.

Notice

A copy of this AL is being sent to SoCalGas' GO 96-B service list and the Commission's service list in R.13-11-005 and A.17-01-013. Address change requests to the GO 96-B service list should be directed via e-mail to Tariffs@socalgas.com or call 213-244-2837. For changes to all other service lists, please contact the Commission's Process Office at 415-703-2021 or via e-mail at Process_Office@cpuc.ca.gov.

/s/ Joseph Mock
Joseph Mock
Director – Regulatory Affairs

Attachments

California Public Utilities Commission

ADVICE LETTER SUMMARY

ENERGY UTILITY

MUST BE COMPLETED BY UTILITY (Attach additional pages as needed)

Company name/CPUC Utility No.: Southern California Gas Company

Utility type:
☑ ELC ☑ GAS ☐ WATER
☐ PLC ☐ HEAT

Contact Person: Ray B. Ortiz
Phone #: (213) 244-3837
E-mail: ROrtiz@socalgas.com
E-mail Disposition Notice to: Tariffs@socalgas.com

EXPLANATION OF UTILITY TYPE
ELC = Electric GAS = Gas
PLC = Pipeline HEAT = Heat
WATER = Water

(Date Submitted / Received Stamp by CPUC)

Advice Letter (AL) #: 5821, et al.

Tier Designation: 2

Subject of AL: 2022 Joint Cooperation Memorandum (JCM) of 3C-REN, SoCalGas, SCE, and PG&E Pursuant to Decision (D.) 18-05-041

Keywords (choose from CPUC listing): Energy Efficiency

AL Type: ☐ Monthly ☐ Quarterly ☐ Annual ☑ One-Time ☐ Other:

If AL submitted in compliance with a Commission order, indicate relevant Decision/Resolution #: D.18-05-041

Does AL replace a withdrawn or rejected AL? If so, identify the prior AL: N/A

Summarize differences between the AL and the prior withdrawn or rejected AL: N/A

Confidential treatment requested? ☐ Yes ☑ No

If yes, specification of confidential information: N/A
Confidential information will be made available to appropriate parties who execute a nondisclosure agreement. Name and contact information to request nondisclosure agreement/ access to confidential information:

Resolution required? ☐ Yes ☑ No

Requested effective date: 7/15/21

No. of tariff sheets: 0

Estimated system annual revenue effect (%): N/A

Estimated system average rate effect (%): N/A

When rates are affected by AL, include attachment in AL showing average rate effects on customer classes (residential, small commercial, large C/I, agricultural, lighting).

Tariff schedules affected: N/A

Service affected and changes proposed[1]: N/A

Pending advice letters that revise the same tariff sheets: N/A

[1]Discuss in AL if more space is needed.

Clear Form

Protests and all other correspondence regarding this AL are due no later than 20 days after the date of this submittal, unless otherwise authorized by the Commission, and shall be sent to:

CPUC, Energy Division
Attention: Tariff Unit
505 Van Ness Avenue
San Francisco, CA 94102
Email: EDTariffUnit@cpuc.ca.gov

Name: Ray B. Ortiz
Title: Regulatory Tariff Manager
Utility Name: Southern California Gas Company
Address: 555 West Fifth Street, GT14D6
City: Los Angeles State: California
Telephone (xxx) xxx-xxxx: (213) 244-3837
Facsimile (xxx) xxx-xxxx: (213) 244-4957
Email: ROrtiz@socalgas.com

Name: SoCalGas Tariffs
Title:
Utility Name: Southern California Gas Company
Address: 555 West Fifth Street, GT14D6
City: Los Angeles State: California
Telephone (xxx) xxx-xxxx: (213) 244-2837
Facsimile (xxx) xxx-xxxx: (213) 244-4957
Email: Tariffs@socalgas.com

Clear Form

ATTACHMENT A

Advice No. 5821

3C-REN, SoCalGas, SCE, and PG&E
2022 Joint Cooperation Memorandum

Table of Contents

I. 3C-REN PORTFOLIO SUMMARY OF PROGRAMS OFFERED FOR 2022

Table 1. 3C-REN Summary of Programs

3C-REN Program Unique ID	Sector	Estimated Annual Budget[1]	Eligible Measures
3C-REN WE&T (3C-WET-001)	WE&T	$1,165,338	N/A
3C-REN C&S (3C-CC-001)	C&S	$1,492,833	N/A
3C-REN RES DI (3C-R-001)	Residential	$5,702,182	Air sealing, insulation, HVAC measures, water flow controls, smart thermostat, power strip, duct system servicing, appliances, HVAC servicing, and water heating measures.[2]

II. SUMMARY AND COORDINATION OF 3C-REN AND IOU(s) SoCalGas, SCE, AND PG&E PROGRAMS OFFERED FOR 2022 THAT ARE COMPARABLE

A. 3C-REN WE&T Program (3C-CC-001)

The 3C-REN will continue to offer a cross-cutting WE&T program designed to fill gaps in current investor-owned utilities[3] (IOU) offerings for the 3C-REN territory. The 3C-REN Building Performance Training program offers career pathways and enrichment by providing access to in-person and on-line trainings, mentorship opportunities, and cross promotion of IOU workforce trainings, engaging hard-to-reach (HTR) workers and those in identified disadvantaged communities (DACs)

Building professionals living and working in the 3C-REN territory face unique

[1] Actual budget information will be provided in 3C-REN's Energy Efficiency Annual Budget Advice Letter submittal on September 1, 2021.
[2] This is a preliminary list of measure types, and final measures are provided in the program Implementation Plan.
[3] For the purposes of this Joint Cooperation Memorandum, the IOUs consist of SoCalGas, SCE and PG&E.

challenges given the dispersed nature of communities within the Tri-County Region. The region, and its building professional workforce, have historically struggled to fill key positions in energy efficiency, including the retrofit market and energy code compliant new construction. The 3C-REN WE&T activities address these challenges through collaboration with existing providers and programs; apprenticeship-style learning; targeted management, technical and soft-skill trainings for building professionals; and integrated resources for design and compliance professionals.

The 3C-REN territory is in need of high-performance buildings (i.e. energy efficient and resilient buildings) and a workforce of building professionals able to:

- Market, design, build, and retrofit buildings for high performance;
- Learn about, install, and maintain new technologies essential for high performance;
- Grow customer demand for EE by communicating the value of high-performance buildings; and
- Access local training and services customized to address the challenges above.

The 3C-REN delivers technical and soft skill trainings and certifications focused on high performance buildings. The program supports building professionals and those seeking career pathways in residential and commercial design, construction, and related industries. Trainings are delivered locally and designed to meet the unique needs of the tri-county region.

The 3C-REN WE&T program has a goal to expand its partnerships to develop local career pathway options in building performance. This will be done by talking to career pathway programs established in the tri-county area and identify opportunities for collaboration and cross promotion. The program seeks to expand its engagement with career pathway stakeholders, such as community colleges, high schools, and workforce investment boards.

The 3C-REN applies a holistic approach to the market with highly targeted training events, using apprenticeship and mentoring style models to enhance the workforce within the 3C-REN territory. 3C-REN's workforce training program goes beyond the classroom setting and skills are reinforced with real world on-the-job applications, while simultaneously influencing direct energy savings. As

a result of a stronger workforce skills base, building professionals will increase efficiency and efficacy with existing resources.

The proposed program budget for 3C-REN WE&T, 3C-WET-001, is $1,165,338.

The program targets local public and private building professionals needing more in-depth training, such as: contractors, HVAC technicians, engineers, architects, designers, certified energy managers, local jurisdictions' building & safety department staff, lighting professionals, real estate professionals, raters, including professionals in DACs and HTR areas, and educational institutions (e.g. community colleges, universities, adult ed, trade schools), as well as other key market actors. The program leverages relationships with industry such as architectural and contractor associations to ensure broad engagement.

The 3C-REN's WE&T program is non-resource and serves to support 3C-REN and IOU programs in the region by training the workforce that can deliver resource programs and meet code. The program is designed to be complementary to IOU programs and to fill gaps in existing IOU programs while integrating with C&S compliance support.

1. Comparable SoCalGas, SCE and/or PG&E Programs

Table 2: WE&T Program Comparison

WE&T	3C-REN	PG&E	SCE	SoCalGas
Non-Resource Program Name	3C-REN WE&T Building Performance Training	PG&E WE&T Integrated Energy Education & Training (IEET)[4]	SCE WE&T Integrated Energy Efficiency Training (IEET)[5]	SoCalGas WE&T Integrated Energy Education Training (IEET)[6]
Eligible Measures	N/A	N/A	N/A	N/A

[4] The C&S Compliance Improvement subprogram is also a comparable program. More information on this program is listed in Section B

[5] The C&S Compliance Improvement subprogram is also a comparable program. More information on this program is listed in Section B

[6] The C&S Compliance Improvement subprogram is also a comparable program. More information on this program is listed in Section B

Estimated 2022 Budget[7]	$1,165,338	$8,052,000	$3,850,000	$3,250,000
Target Audience	Locally licensed public and private building professionals needing more in-depth training, such as contractors, HVAC, engineers, architects, designers, certified energy managers, local jurisdictions' building & safety department staff, lighting professionals, real estate professionals, raters, and professionals in DACs and HTR areas, and educational institutions, as well as other key market actors.	Any person who designs, builds, maintains, plan checks, inspects, and/or operates buildings including engineers, architects, contractors, lighting designers, HVAC technicians, real estate professionals, building operators, facility managers, energy consultants, plans examiners, building inspectors, and more. Additionally, this program supports other organizations' instructors who are training a similar audience.	Workforce needing technical residential, multi- family, and/or small business trainings at Energy Centers or online via simulcast or webinar.	Workers in, or pursuing careers and occupations in energy efficiency, gaining and providing professional and technical capabilities, specifically useful for achieving CA-IOU energy savings targets. Training will be conducted at Energy Center, alternative site locations and distribution channels in collaboration as appropriate, with non-IOU sources, feasible for reaching target audiences.

Pacific Gas & Electric

PG&E WE&T Integrated Energy Education Training (IEET) - [PG&E21071]

The PG&E WE&T IEET subprogram offers hundreds of technical workforce trainings per year with the goal of equipping a California workforce with the tools, resources, and skills to meet the State's climate goals. Appendix B includes a categorized list of the residential, multi-family, and/or small business trainings conducted in 2020 and 2021 scheduled to date as an illustration of our potential 2022 offerings in the three areas that appear of greatest interest to the 3C-REN. Appendix B also includes a full list of the in-person, simulcast, webinar classes and on-demand classes in the same period.

[7] Estimated 2022 Budgets are based on 2021 Annual Budget Advice Letter (ABAL) filings. Final budget information for 2022 will be provided in program administrator 2022 ABAL filings on September 1, 2021.

Some of the classes listed in Appendix B are restricted to PG&E's Energy Training Center (ETC) in Stockton, the Food Service Technology Center (FSTC) in San Ramon, or other specific locations due to the need to use large teaching props or laboratories. However, the majority of classes can be offered at off-site locations and/or via online simulcast or webinar, especially if a local organization will assist with marketing and outreach to ensure good attendance from the appropriate target audience. A class being offered at other locations is also dependent on the instructor being willing and able to travel. PG&E's WE&T program also has an online on-demand learning platform, where many classes are focused on residential construction and contractors. See Appendix B for a list of on-demand classes. Appendix B below also includes more information on additional C&S training provided by the IOUs.

PG&E has a Tool Lending Library (TLL) with thousands of energy diagnostic tools available to borrow at no-cost to the borrower for short-term (~ 2 weeks) loans. The TLL addresses an up-front cost barrier faced by many small businesses and energy consultants. Once local health ordinances allow, tools will be available from the ETC in Stockton or from San Ramon. PG&E can also ship tools anywhere in California if the borrower or 3C-REN covers shipping costs.

The PG&E WE&T team does not offer soft skills training such as interviewing skills, resume writing, etc. A third-party implementer will coordinate with organizations that offer soft skills training as part of the statewide Career and Workforce Readiness (CWR) program scheduled to launch in late 2021 (See Section 3 below).

PG&E WE&T does not offer the certifications listed in the 3C-REN Business Plan – BPI, HERS, or NATE; however, PG&E supports these certifications by providing classes that prepare students to take the tests and complete them successfully. Examples include PG&E's IHACI NATE Series, an 8-part class that prepare technicians to take the test. IHACI is an approved NATE testing proctor. Another example is PG&E's Combustion Safety and Depressurization class that prepares workers to take the BPI examination.

Southern California Edison

SCE WE&T Integrated Energy Education & Training Program – [SCE-13-SW-010A]

The SCE Workforce WE&T Integrated Energy Education & Training program (formerly Centergies), offers resources to help shape the future energy workforce through occupational, employer and technology focused workshops

and seminars, along with workplace-based hands-on technical training. These programs aim to provide pathways and training for certifications and credentials in energy-related industries. Appendix B includes a list of trainings offered or schedule for 2021 as an example of potential offerings for 2022.

In addition to the trainings offered, the Foodservice Technology Center conducts standards-based equipment testing and evaluation that enhance commercialization of emerging energy-efficient technologies and programs. These services are delivered with technical integrity and scientific rigor in order to ensure our partners stay competitive and maintain cost effectiveness.

The Energy Centers provide additional value-added customer programs and services such as the Tool Lending Library, tours, and on-site energy audits at no-cost to the customer.

Southern California Gas Company

SoCalGas WE&T Integrated Energy Education Training (IEET) – [SCG3729]

The SoCalGas WE&T Integrated Energy Education Training (IEET) subprogram (formerly Centergies) offers both technical and foodservice workforce trainings that can leverage 3C-REN local contacts to inform and equip workforce talent with skills to assist in meeting the State's energy and climate goals. Appendix B includes a list of trainings from 2021, many of which will be part of our 2022 training portfolio.

The WE&T Program contributes to the investor-owned utilities' (IOUs') energy efficiency goals by empowering customers and market actors with the knowledge to make energy reduction decisions. WE&T's primary target audience includes market actors who design, build, maintain, and operate buildings and building systems—engineers, technicians, building operators, designers, contractors, etc. Because these market actors have the potential to shape a building's energy use, WE&T teaches them how to recognize energy savings and balanced energy solutions to address GHG-reduction, and then provides them skills, tools, and resources to act upon those opportunities. Additionally, WE&T supports Post-secondary institutions that are training future generations of the energy workforce by providing them energy efficiency, sustainability, and green career awareness classes, internships, materials and resources.

2. Coordination Protocol Between Programs

The goal of coordination between 3C-REN and the IOU WE&T, Codes &

Standards programs, including Public Sector[8] programs, is to ensure that ratepayer funds deliver resources efficiently and effectively across the shared territories. The IOUs and 3C-REN will approach coordination with the goal of offering transparency through regular communication, efficiency through a collaborative approach to any shared resources, and support for the success of programs across the service area. The IOUs and 3C-REN will meet regularly to coordinate the WE&T and C&S programs.

3C-REN aims to provide workforce, education, and training not currently being provided by the IOUs within the 3C-REN territory, as well as services targeting hard-to-reach markets that may complement existing IOU resources. To ensure 3C-REN can meet these eligibility categories, the IOUs will provide 3C-REN with their list of scheduled WE&T trainings. Whenever feasible, 3C-REN will leverage existing IOU curriculum and training by communicating training needs via email or in regular coordination meetings with IOU partners. A clear chain of communication and identified contacts will be exchanged for each program and/or sub-program.

IOUs will provide their list of trainings to 3C-REN on a quarterly basis, and 3C-REN will provide a similar list to the four IOUs. The list of trainings will include the following information:

- Class name(s)
- Description(s)
- Instructor name(s)
- Whether IOUs owns content (as opposed to licensing it)
- Mode of access and location (ex: in-person, training center/city, online)
- Class schedule (if one exists) and URL for class calendar(s)

Each IOU and 3C-REN shall distribute this quarterly list of classes to the appropriate internal staff and/or consultant(s).

Additionally, a standing agenda item at the quarterly meeting will be to discuss the topics of trainings in development, even if only at a high level. This will reduce the potential of duplication of efforts.

Once 3C-REN reviews this list, 3C-REN will determine which of the IOUs' existing offerings should be leveraged and coordinate with the IOUs to deliver these resources. If 3C-REN determines there is a training gap, 3C-REN will develop additional training resources and communicate that to the IOUs, working

[8] The SoCalGas Public Sector Programs for 2022 in 3C-REN territory will be provided in SoCalGas' 2022 ABAL in September 2021.

to avoid duplication by leveraging any existing resources. The IOUs and 3C-REN will administer a post-course evaluation to course participants to assess the quality of the courses.

3. Coordination Between Statewide (SW) Program(s)

Working with PG&E as the statewide administrator for the Career and Workforce Readiness (CWR) and Career Connections (CC) WE&T subprograms, 3C-REN will leverage the coordination protocol described above to include any statewide considerations. The 3C-REN program currently does not include a traditional K-12 student component, so coordination on the Career Connections sub-program is likely not needed. The CWR implementer will be responsible for the design, implementation, and geographic distribution of the CWR program. Once the CWR implementer is under contract, PG&E will provide 3C-REN with the implementer's contact information.

B. 3C-REN C&S PROGRAM 3C-CS-001

The 3C-REN will continue to offer a cross-cutting C&S program designed to fill gaps in current IOU offerings for the 3C-REN territory. The 3C-REN C&S Energy Code Connect program offers local, in-person and on-line person-to-person trainings; Regional Forums; and an Energy Codes Coach service that provides in-person, over the phone, and online expert assistance for energy codes and green building standards.

Through this program and its suite of services, public and private sector building professionals in the tri-county region receive Energy Code and California Green Building Standards training and support for plan review and field compliance. All design and construction stakeholders, from architects to building inspectors and from mechanical engineers to plans examiners, are encouraged to attend trainings. The Energy Codes Coach service, having local in-person and on-call experts for the region, fosters an environment where stakeholders have a deeper understanding of building performance, code compliance, and interrelated building practices. The goal is to increase comprehension, compliance, and enforcement of the Energy Code and Green Building Standards throughout the tri-county region, providing the workforce with a more stable business climate and known code compliance resources.

The proposed program budget for 3C-REN C&S, 3C-CS-001 is $1,492,833

The target audience is all public and private sector building professionals including construction and design-side stakeholders' architects and designers, building departments, contractors, architects, field inspectors, mechanical engineers, and plans examiners checkers. This is a non-resource program.

1. Comparable SoCalGas, SCE and/or PG&E Programs

The IOU Compliance Improvement subprogram[9] (of which Energy Code Ace is a key component) targets actors within the building and appliance energy code supply chains to maintain comprehensive statewide compliance with energy codes and appliance standards, such as: manufacturers, distributors, retailers, architects, energy consultants, contractors, plans examiners, building inspectors, etc. Whereas the California Energy Commission is responsible for implementing state policy by establishing new Codes and Standards, others (architects, energy consultants, mechanical engineers, IOUs, builders, contractors, etc.) are responsible for interpreting the code and completing compliance forms while jurisdictions' building departments are responsible for enforcing the code. Building codes and appliance standards can be difficult to understand and time consuming to implement, therefore some industry actors fail to comply with regulatory requirements fully.

Compliance improvement program needs are determined through a performance-based solution approach to identify training, tools, resources and outreach necessary to narrow the gap between actual and desired performance, and principals of adult learning theory are employed to improve knowledge swings during training and increase long-term retention. Multiple training modalities are used to maximize student participation. With a few exceptions, a consistent curriculum, featured on EnergyCodeAce.com, is developed by the compliance improvement program and delivered statewide by a team of subject matter experts.

Table 3: C&S Program Comparison

C&S	3C-REN	PG&E	SCE	SoCalGas
Non-Resource Program Name	3C-REN C&S Energy Code Connect	Statewide C&S Compliance Improvement Subprogram	Statewide C&S Compliance Improvement Subprogram	Statewide C&S Compliance Improvement Subprogram
Eligible Measures	N/A	N/A	N/A	N/A

[9] Note: The Compliance Improvement subprogram is a statewide program offered by all IOUs.

Estimated 2022 Budget[10]	$1,492,833	$ 5,533,011	$2,600,000	$582,000
Target Audience	All stakeholders impacted by energy code	All stakeholders impacted by the energy code	All stakeholders impacted by the energy code	All stakeholders impacted by the energy code

2. Coordination Protocol between programs

The same coordination protocol as mentioned above for WE&T applies to C&S classroom and online trainings. Again, the goal of coordination between 3C-REN and the IOUs is to ensure that ratepayer funds deliver resources efficiently and effectively across the shared territories. With that in mind, the IOUs and 3C-REN will approach coordination with the goal of offering transparency through regular communication, efficiency through a collaborative approach to any shared resources, and support for the success of programs across the service area. The IOUs and 3C-REN will meet regularly to coordinate the WE&T and C&S programs.

3C-REN aims to provide coverage not currently being provided by the IOUs, as well as services targeting hard-to-reach markets that may complement existing IOU resources. The majority of 3C-REN's Energy Code Connect program activities are related to offering Energy Code and Green Building Standards trainings, Regional Forums, and the Energy Codes Coach service.

The IOUs will provide 3C-REN with their respective lists of available C&S trainings including those in development stages. Whenever feasible, 3C-REN will leverage existing IOU curriculum and training by communicating training needs via email or in regular coordination meetings with the IOU. A clear chain of communication and identified contacts will be exchanged for each program and/or sub-program.

IOUs' Compliance Improvement team representative will provide a list of trainings to 3C-REN on a quarterly basis and will include the following information:

- Class name(s)

[10] Estimated 2022 Budgets are based on 2021 Annual Budget Advice Letter (ABAL) filings. Final budget information for 2022 will be provided in program administrator 2022 ABAL filings on September 1, 2021.

- Description(s)
- Instructor name(s)
- Course length time
- Mode of access and location (ex: in-person, training center/city, online)
- Class schedule (if one exists)
- Course agenda

Additionally, a standing agenda item at the quarterly meeting will be to discuss the topics of trainings in development, even if only at a high level. This will reduce the potential for duplication of efforts.

Once 3C-REN reviews this list, 3C-REN will determine which existing offerings should be leveraged and coordinate with the IOUs to deliver these resources. 3C-REN will develop a calendar with potential dates, of when these offerings can be delivered to various audiences in the tri-county region. This calendar will be shared with the IOU's and scheduled based on the availability and resource requirements. When 3C-REN determines there is a training gap, 3C-REN will develop additional training resources and communicate that to the IOUs, working to avoid duplication by leveraging any existing resources.

The IOUs will make the 3C-REN aware of resources available as courses are scheduled for delivery and new job aides (Energy Code Ace "resources" or "tools") are developed. A portion of the Statewide C&S Team's training schedule is set at the beginning of the year while the rest remains flexible since most courses are offered upon request as a result of the team's outreach efforts. All offerings are posted on the Energy Code Ace website training page as courses are scheduled.

3. Coordination Between Compliance Improvement Sub-program(s)

As noted above, in addition to training offerings and Regional Forums, 3C-REN's C&S activities are also related to the Energy Codes Coach service which will refer customers who may benefit from statewide programs.

There is an extensive list of classes offered by the C&S team. The IOU Compliance Improvement team representative will provide their list of trainings to 3C-REN per the protocol listed above.

Should the need to coordinate efforts arise, 3C-REN will follow similar protocols as defined under the coordination protocol between programs. Specifically, 3C-REN will work with the local IOU administrators to identify appropriate program

contacts, confirm existing resources, share existing resources, and collaboratively determine if resources should be jointly offered or if 3C-REN should build upon resources.

C. 3C-REN RES Direct Install PROGRAM 3C-R-001

The 3C-REN will continue offering a RES DI Home Energy Savings program designed to fill a gap in current IOU offerings for the 3C-REN territory. The 3C-REN program delivers a direct install (DI) program that targets hard-to-reach (HTR) residential customers, including single family, multifamily, and mobile homes, renters and owners, and DACs in Ventura, Santa Barbara and San Luis Obispo Counties, offering a single, unified program to regional residents.

The program provides energy and behavior change education, installation of simple energy saving measures to build customers' trust and interest, and delivery of a pathway to deeper savings by offering co-pay options for more substantial upgrades. 3C-REN partners with local non-profits, who currently deliver the Energy Savings Assistance (ESA) Program, utility Residential Direct Install, and Low-Income Home Energy Assistance Programs (LIHEAP) to leverage their experience and infrastructure to provide 3C-REN program services to a broader audience than they currently serve.

Qualifying customers currently receive a virtual assessment from a trained assessor who collects information on the home and provides consumer education. Education focuses on behavioral changes and easy actions the customer can take to reduce energy use in addition to 3C-REN's other program offerings. Assessors also cross-promote utility bill management tools (e.g., Green Button) and relevant utility (e.g., SCE Summer Rate Program) and financing (e.g., REEL) programs. Following the virtual assessment, DI measures are installed in the home, and assessors provide initial information on co-pay options for more substantial upgrades.

A WE&T and C&S overlay is included in this program as 3C-REN works with local non-profit low-income providers to help build their staffing capacity and provide training, as well as code coaching for permitted projects. In addition, these providers will be educating the public about these offerings to engage their involvement as well. Some projects may also be used as hands-on, in the field training opportunities that results in increased quality assurance. Partnering with local non-profit and low-income service providers also provides an opportunity to create career pathways for disadvantaged workers as many of the crew members and contractors live in the DACs that they serve.

The proposed program budget for 3C-REN RES DI, (3C-R-001) will be $5,702,182.

The 3C-REN Residential RES Direct Install Home Energy Savings program targets hard-to-reach (HTR) residential customers, including single-family, multifamily, and mobile homes, renters and owners, and moderate-income families not currently being served by, nor meeting the criteria of current ESA and LIHEAP in Ventura, Santa Barbara and San Luis Obispo Counties.

This resource program includes measure types such as air sealing, insulation, HVAC, water flow controls, smart thermostat, power stripduct system servicing, appliances, HVAC servicing, and water heating measures.[11] Single measures will be allowed and savings will be deemed per measure.

3C-REN currently has selected a multi-family program implementer. 3C-REN will engage the IOUs for the multifamily subprogram during 2021 to discuss a coordination strategy.

1. Comparable IOU Programs

Table 4: RES DI Program Comparison

DI	3C-REN	SCE	SCE	PG&E	PG&E	SoCalGas
Resource Program Name	3C-R-001 RES DI-Home Energy Savings Program	SCE_3P_2020RCI_004 SCE Willdan Residential Third-Party Program	SCE-13-SW-001G SCE Residential Direct Install Program	PGE Pay For Performance Programs: 1) Comfortable Home Rebates (PGE_Res_001a) 2) Home Intel (PGE_Res_001b), 3) Home Energy Rewards (PGE_Res_001c)	PGE_Res_003 Multifamily Energy Savings Program (MESP)	SCG3883 – ResACE- Residential Advanced Clean Energy Program

[11] Please note that this is a preliminary list of measure types, and that the final measures will be provided in the program Implementation Plan

DI	3C-REN	SCE	SCE	PG&E	PG&E	SoCalGas
Eligible Measures	Air sealing, insulation, HVAC measures, water flow controls, smart thermostat, power strip, plug load feedback device, duct system servicing, appliances, pool pumps, and water heating measures.[12]	The program offers deemed, customized calculated, and NMEC-based site-specific approach measures for energy-saving equipment for both common and in-unit areas of multifamily properties; end uses include HVAC and Lighting, and Water Heating.	HVAC Measures (Fan Delay Controller and Duct Test and Seal), Residential Smart Thermostat, Faucet Aerators and Efficient Showerheads.	Customers across PG&E territory are eligible who have 12 month energy data: 1) Comfortable Home Rebates: Home maintenance and upgrade program focused on Heating, cooling, water heating, insulation, duct work, air sealing, lighting, and pool pumps. Cost varies depending on measures selected, rebates from $585 to $3,500 depending on measures selected and CEC Climate Zone 2) Home Intel: No cost to customer, In-depth analysis of home's energy use, customized behavioral recommendations and energy coaches to help customers. Includes monthly energy efficiency progress report. 3) Home Energy Rewards: Free to start, In-depth analysis of your home's energy use, customized recommendations and free energy savings kit (LEDs, water saving devices). Discounted energy efficient products. Points can be earned and redeem as rewards.	PG&E's Multifamily Energy Savings Program includes a direct install program option for multifamily properties within PG&E's service territory. Eligible measures include Low flow and thermostatic showerheads, Low flow sink/lavatory aerators, Smart Thermostats, Hot water pipe Insulation, Refrigerators and freezers, High efficiency furnaces, and common area Energy Star clothes washers, and NGAT testing where applicable.	Exhaust Venting (Kitchen/Bath) – cut opening with vent (Done in conjunction with attic insulation), Vent – Eave (Done in conjunction with attic insulation), Duct Repair – (Done in conjunction with attic insulation), Duct Testing, Duct Sealing, Duct Board Installation, Low Flow Kitchen Faucet Aerator, Low Flow Bathroom Faucet Aerator, Low Flow Showerhead, Low Flow Handheld Showerhead, Showerhead adaptor, Shower Diverter Valve (in conjunction with Low Flow Showerhead), Thermostatic Shower Valve, Smart Thermostat, Natural Gas Appliance Testing (NGAT) (done in conjunction with Duct Sealing).

[12] Please note that this is a preliminary list of measure types, and that the final measures will be provided in the program Implementation Plan.

DI	3C-REN	SCE	SCE	PG&E	PG&E	SoCalGas
Estimated 2022 Budget[13]	$5,702,182	$6,300,000		$4,903,644	$3,882,555	$3,000,000
Target Audience	Will target hard-to-reach (HTR) residential customers, including single-family, multifamily, and mobile homes, renters and owners, and moderate-income families not currently being served by, nor meeting the criteria of current ESA and LIHEAP in Ventura, Santa Barbara and San Luis Obispo Counties.	Property owners and managers of existing multifamily properties of 10 or more units within SCE's service area. The program targets all levels of multifamily buildings (i.e., low-income, affordable-to-moderate income, market-rate), including those located in DACs. .	Residential single-family home customers within SCE's service territory.	Single Family Residential with 12 months energy use data, within PG&E's service territory. Some Multifamily customers may be eligible for the Home Intel program. Some 2-4 unit buildings may be eligible for Comfortable Home Rebates. Home Intel and Home Energy Rewards are no-cost to customers and therefore customers of all incomes, above ESA eligibility, can be supported by these programs.	MESP has a target audience of all types of multifamily buildings that have 5 or more units. MESP has HTR and DAC goals	Mainstream, market rate homeowners.

Southern California Edison

SCE-13-SW-001G - SCE RES DI (formerly Energy Upgrade California – Middle

[13] Estimated 2022 Budgets are based on 2021 Annual Budget Advice Letter (ABAL) filings. Final budget information for 2022 will be provided in program administrator 2022-2023 BBAL filings on September 1, 2021.

Income Direct Install [MIDI])

The RES DI program targets single-family residential customers. The program allows customers to realize the value of energy efficiency through a variety of no-cost products and services to meet individual customer needs and enable continuous energy management. Additionally, the services offered through the RES DI program are leveraged by various Water District agencies that deploy water conservation program offerings to deliver a comprehensive water energy nexus solution.

Target marketing is performed in select areas to create customer awareness and engagement. Customers are provided with education on the measures installed in their homes, other measures that could further improve their energy savings, and a general understanding about the importance of saving energy and the large impact everyday behavior has on conservation.

SCE_3P_2020RCI_004 - Willdan Multifamily Program

SCE Willdan Residential Third-Party Program serves the entire Multifamily (MF) segment of the Residential sector. It complies with Southern California Edison (SCE) and California Public Utilities Commission (CPUC) requirements and offers a consolidated approach that includes segment-specific marketing, technical assistance, technologies, whole-facility opportunities, financing, and measurement and verification (M&V). Integrated Demand Side Management (IDSM) and electrification upgrades are offered to customers, excluding any storage technology. This approach minimizes the barrier of customer confusion, unlike the existing siloed programs. Energy efficiency (EE) / IDSM upgrades are delivered with a full-service, pay-for-performance approach.

The program will offer a full-service building approach to MF properties throughout the SCE territory. The new MF program will offer a single point of contact (SPOC) and with a significant share of program services provided through open trade pro & community-based organization (CBO) networks, local contractors, and subcontractors who specialize in the MF segment.

The program's primary objective is to meet SCE's business plan goals and achieve deeper savings through comprehensive energy management solutions. An additional objective is to increase EE adoption rates by targeting MF residential sub-segments including hard-to-reach (HTR) customers and/or those in disadvantaged communities (DACs). An integrated team with extensive MF experience will develop tailored responses that align with SCE's objectives.

The program delivers increased savings through comprehensive multi-technology solutions. An integrated team located within SCE's service territory draws on existing customer relationships with property owners to increase the number of completed projects.

Southern California Gas Company

SCG3820 - RES-Direct Install Program

The RES DI Program provides no-cost energy improvements to eligible customers to help make their homes more comfortable and help conserve energy, which could lead to lower utility bills. Should the customer decide to further their energy savings efforts, the Program reduces the amount of money a customer needs to invest in order to participate in the single-family or multifamily home upgrade programs.

The program is available to renters and homeowners living in single-family and multifamily dwellings. Program services are provided by authorized vendors who are not employees of SoCalGas, but are under contract to SoCalGas to deliver program services. A qualified contractor will assess eligible homes for energy-saving services and program eligibility, a minimum of 3 must be installed.

SCG 3702 Residential Energy Efficiency Program (REEP)

SoCalGas Multifamily Energy Efficiency Program (MFEER) is a subset program of REEP. MFEER offers cash incentives for the installation of qualified energy efficiency products in Apartment dwelling units, Common areas of apartments, condominium complexes, and mobile home parks. Property owners (and managers) of existing residential multifamily complexes with two or more dwelling units may apply.

SCG 3705 RES-Home Upgrade Program (MF Whole Building)
The MF Whole Building program targets the multifamily housing retrofit market and promotes long-term energy benefits through comprehensive (whole building) energy efficiency retrofit measures identified through an investment grade audit. This performance-based approach is aimed at assisting multifamily property owners and managers with making informed energy-efficiency decisions.

A Multifamily Energy consultant provides customer guidance, project review, pre and post project assessment/inspection and submission of required documentation/reports. The consultant also helps draft expected energy savings and incentive amounts for customer and utility approval. Such incentives are

calculated incentives based on whole property/building simulated gas energy reductions. Measure installation may be conducted by any licensed contractor selected by customers. Incentives are intended to partially offset retrofit costs and are paid on a “per dwelling unit” basis. Per dwelling approach enables participants to experience economies of scale with larger multifamily properties.

SoCalGas provides specialized Multifamily support through its Single Point of Contact (SPOC). The SPOC assists customers individually through the initial application process and shares information about various multifamily program offerings. Customers will be referred to other programs whenever additional benefits for a certain project are identified through other programs; this includes referring customers to 3C-REN staff and Program Administrators from other utilities.

SCG 3888 Multifamily Space and Water Heating Program (MF SAWH)
The program is implemented by a third party which specializes in hydronic systems. The program will target multifamily properties with 30 units or more that have combined central domestic hot water and space heating. The program will provide installation of the following measures at no cost to customers through a direct install approach: water heater VFD pump control, dual set point temperature control, pipe insulation, and faucet aerator (or under sink flow restrictor).

SCG 3889 Multifamily Energy Alliance (MEA)
The MEA program is a 3rd Party Program seeking to provide accessible solutions to SoCalGas customers through a direct install (no-cost to customer) approach for thermostats, low flow showerheads, thermostatic shower valves, faucet aerators, and recirculation pump controls. Additionally, the program will aim to deliver a comprehensive deemed approach by also providing rebates for clothes washers, attic insulation, pipe/fitting insulation, energy star dryers, furnaces, tankless water heaters, pool/spa heaters, and boiler controls. One of the program's goal is to serve customers in Hard to Reach and Disadvantaged Communities along with market rate customers. The program will direct customers to SoCalGas’ Energy Savings Assistance Program and Multifamily Whole Building Program when such programs are determined to represent a best fit solution for a project.

Pacific Gas & Electric Company

PGE_Res_001a, PGE_Res_001b, PGE_Res_001c Pay for Performance (P4P) Programs (Comfortable Home Rebates, Home Intel, Home Energy Rewards)

Customers across PG&E territory who have 12 months of energy data are eligible to participate in PG&E’s P4P programs, among other eligibility criteria. Under the Comfortable Home Rebates program, home maintenance and

upgrades are focused on heating, cooling, water heating, insulation, duct work, air sealing, lighting, and pool pumps. Costs vary depending on measures selected by the customers and rebates vary between $585 and $3,500 depending on measures selected and CEC Climate Zone. Through the Home Intel program, there is no cost to customer. Energy coaches provide an in-depth analysis of a home's energy use and customized behavioral recommendations help customers. Customers receive a monthly energy efficiency progress report. The Home Energy Rewards program is also free to start for eligible customers. In-depth analysis of a home's energy use is provided along with customized recommendations. A free energy savings kit (LEDs, water saving devices) is sent to the customer and customers are offered discounted energy efficient products. Customers can earn points and redeemed them as rewards.

PG&E_Res_003 Multifamily Energy Savings Program

PG&E's Multifamily Energy Savings Program (MESP) is a third-party implemented program by TRC Solutions to serve multifamily properties of units five or greater within PG&E's service territory. MESP offers energy efficiency upgrade services to multifamily buildings through deemed and custom projects as well as a direct install delivery channel. The direct install component offers multifamily properties low-cost/no-cost measures. Participation in the direct install track may serve as a springboard to a property participating in deemed or custom upgrade projects.

TRC began MESP ramp up activities following CPUC approval of the contract in October 2020, following the completion of the first wave of PG&E's third-party, multi-sector solicitations. MESP aims to serve multifamily customers, inclusive of smaller properties and underserved regions that will most benefit from property upgrades.

2. Coordination Protocol Between Programs

As described for previous programs, the IOUs and 3C-REN approach coordination with the goal of offering transparency through regular communication, efficiency through a collaborative approach to any shared resources, and support for the success of programs across the service area.

For its residential DI program Home Energy Savings, 3C-REN and the IOUs will communicate via email or in regular coordination meetings. A clear chain of communication and identified contacts will be exchanged for each program. 3C-REN and the IOUs have also developed a protocol to verify customer eligibility prevent "double dipping" and will use this protocol going forward.

The IOUs will make the 3C-REN aware of programs and resources available; including multifamily residential programs. The IOU's will provide written notice once advice letters have been filed and implementation plans have been

uploaded to CEDARS of any new program similar to 3C-REN's RES DI program that may result from the third-party solicitation process. 3C-REN will determine whether resources, such as those for low and moderate- income families, should be jointly offered or if the 3C-REN will build upon IOU resources to offer such programs independently. This will assist with market penetration and afford both the IOU and 3C-REN cross promotion and continuity of services.

There may be instances where a customer may contact 3C-REN for resources, and 3C-REN may identify that the customer would be best served by an IOU program. 3C-REN and the IOUs have established a protocol for customer handoff should either program identify a referral opportunity for another organization's resources. The handoff protocol minimizes the number of customer touchpoints to maximizes the potential for program participation. Ideally, 3C-REN will be able to provide a "warm" or immediate handoff to the IOUs or third-party implementer while the customer is actively engaged by email/phone, so that the customer experiences a seamless service offering between 3C-REN and the IOUs.

3. Coordination Between SW Program (s)

The 3C-REN residential DI program offering is not substantially similar to any statewide program and therefore the parties to this JCM have determined that regular coordination to avoid duplication is unnecessary. However, there are some portions of the program that may allow for and require coordination among programs. In particular, 3C-REN will provide referrals to statewide financing programs to program participants when appropriate. 3C-REN will follow similar established coordination protocols for coordination with utility programs to ensure coordination with statewide programs.

III. 3C-REN PROGRAM COMPLIANCE WITH D.12-11-015

A. 3C-REN UNDERTAKING ACTIVITIES THAT UTILITIES CANNOT OR DO NOT INTEND TO UNDERTAKE.

Although the IOUs do offer C&S and WE&T resources, the IOUs are not currently delivering localized, hands-on services in the 3C-REN service area. The majority of the IOU in-person trainings are offered virtually or at IOU training facilities, which are not located in 3C-REN service area. As noted in D.18-05-041 "3C-REN's proposed activities for WE&T and code compliance have value in terms of

the significant distance of its service area to the IOUs' training centers."[14] For WE&T, the 3C-REN program offers regional, on-the-ground resources to address this gap. As noted in the 3C-REN Business Plan, "the current IOU training and education programs require substantial travel to energy centers outside of the area and are often not designed to meet the needs of a residential home performance workforce." Specifically, the 3C-REN program helps build career pathways by providing access to in-person trainings and mentorships, including HTR workers and those in identified DACs. This includes local Energy Advisor services for in-field training to build capabilities and on-the-job skills, a service not offered by the IOUs. Separately, 3C-REN offers in-person training on technical and soft skills, a service not offered locally by the IOUs.

For C&S, the 3C-REN established a regional Energy Code Coach offering service to run concurrent to and alongside other training efforts. This approach is more hands-on and locally relevant than existing IOU resources. Building departments professionals in the Region receive building performance support and mentoring for plan review and field compliance. All design-side stakeholders, from the architect to field inspector and from the mechanical engineer to the plan checker, are encouraged to attend trainings. The Code Coach approach, having local counter-to-counter and on-call experts for the region, fosters an environment where stakeholders have a deeper understanding of building performance and interrelated concerns.

B. 3C-REN UNDERTAKING PILOTS ACTIVITIES WHERE THERE IS NO CURRENT UTILITY UNDERTAKING, AND WHERE THERE IS A POTENTIAL FOR SCALABILITY TO A BROADER GEOGRAPHIC REACH, IF SUCESSFUL.

At this time, 3C-REN is not proposing a program using this threshold criteria for compliance with D.12-11-015. Instead, 3C-REN is proposing programs that both fill in gaps to IOU services and that target HTR markets.

C. 3C-REN UNDERTAKING PILOT ACTIVITIES IN HARD TO REACH MARKETS, WHETHER OR NOT THERE IS A CURRENT UTILITY PROGRAM THAT MAY OVERLAP.

As noted in D.18-05-041, the CPUC intends to "authorize 3C-REN's proposed business plan activities for residential direct install programs that target hard-to-

[14] D.18-05-41, Finding of Fact 63

reach customers."[15] Through its residential program, the 3C-REN program delivers a DI program that targets hard-to-reach residential customers, including single family and multifamily, renters and owners, and DACs in Ventura, Santa Barbara and San Luis Obispo Counties.

3C-REN addresses this hard-to-reach market through its intervention strategies of "Strategy 1." Build trust and interest in energy savings over time," and "Strategy 2." Apply neighborhood approaches to achieve scale in reach and savings." Under the first strategy, activities include offering a direct install program targeting hard-to-reach customers, as well as simple upgrade packages offered for cost to streamline easy installation and adoption of deeper retrofits in hard-to-reach customers. Under the second strategy, 3C-REN deploys a neighborhood-based approach to engage hard-to-reach customers and integrate workforce development opportunities to build skills and community buy-in.

As noted in the Business Plan, "the 3C-REN intends to offer services to all residents in the three counties, however, the hard to reach populations of moderate income and rural areas will be targeted in marketing and outreach, as well as in program design." There may be instances where a customer may contact 3C-REN, but the customer would be best served by an IOU program. 3C-REN and the IOUs established and use a protocol for customer handoff, as described above.

Table 5. 3C-REN CROSS-CUTTING & RESIDENTIAL D. 12-11-015 Compliance, by program

[15] D.18-05-41, Conclusion of Law 54

D.12-11-015 Threshold Criteria that apply for each program.	Comparable IOU Program if applicable.	1. Activities that utilities cannot or do not intend to undertake.	2. Pilot activities where there is no current offering, and where there is potential for scalability to a broader geographic reach, if successful.	3. Pilot activities in hard to reach markets, whether or not there is a current utility program that may overlap.
3C-REN WE&T 3C-WET-001	PG&E Integrated Energy Education & Training (IEET) SCE WE&T IEET (SCE-13-SW-010A) SoCalGas WE&T Integrated Energy Efficiency Training (SCG3729	Strategy 3. Establish local, targeted training for building professionals. • Local Energy Advisor for in-field training to build capabilities and on-the-job skills • In-person training, hosted locally, on technical and soft skills.		
3C-REN C&S 3C-CS-001	Statewide C&S Compliance Improvement Subprogram	Strategy 4. Provide Regional assistance to Building Departments and Jurisdictions to help comply and adjust to Codes and future updates. Local Energy Code Coach service to provide ongoing technical training for building departments		

D.12-11-015 Threshold Criteria that apply for each program.	Comparable IOU Program if applicable.	1. Activities that utilities cannot or do not intend to undertake.	2. Pilot activities where there is no current offering, and where there is potential for scalability to a broader geographic reach, if successful.	3. Pilot activities in hard to reach markets, whether or not there is a current utility program that may overlap.
3C-REN Residential DI **3C-R-001**	SoCalGas RES DI (SCG 3802) SCE RES DI (Formerly Energy Upgrade California – MIDI) (SCE-13-SW-001G) SCE Willdan Multifamily Program (SCE_3P_2020 RCI_004) PG&E Multifamily Energy Savings Program (MESP) (PGE_Res_003) PG&E Pay for Performance (P4P) Programs (PGE_Res_001a, PGE_Res_001b, PGE_Res_001c, PGE_Res_001d)			Strategy 1. Build trust and interest in deeper energy savings over time. • Offer Direct Install program targeting hard-to-reach customers • Develop simple upgrade packages to streamline and offer easy installation and adoption of deeper retrofits Strategy 2. Employ neighborhood approaches to achieve scale in reach and savings. • Integrate workforce development into neighborhood programs to build skills and community buy- in

APPENDIX A - IOU(s) PORTFOLIO SUMMARY OF PROGRAMS OFFERED FOR 2022

For information on IOUs portfolio of programs, please refer to the California Energy Data and Reporting System https://cedars.sound-data.com/programs/list/.

Table 1. PG&E Summary of Comparable Programs

IOU Program Unique ID	Sector	Annual Budget [16]	Eligible Measures
PG&E Integrated Energy Education & Training **[PGE21071]**	Cross-cutting: WE&T	$8,052,000	Not applicable. Non-resource program
PG&E Compliance Improvement Program **[PGE21053]**	Cross Cutting: C&S	$ 5,533,011	Not applicable. Non-resource program
PG&E Multifamily Energy Savings Program (MESP) **[PGE_Res_003]**	Residential	$3,882,555	Low flow and thermostatic showerheads, Low flow sink/lavatory aerators, Smart Thermostats, Hot water pipe Insulation, Refrigerators and freezers, High efficiency furnaces, and common area Energy Star clothes washers, and NGAT testing where applicable.
PG&E Pay for Performance (P4P) Programs **[PGE_Res_001a, PGE_Res_001b, PGE_Res_001c]**	Residential	$4,903,644[17]	This program claims savings through NMEC methodology and not deemed measures. However, the current measures are: behavioral, LEDs, Low flow sink/lavatory aerators, smart thermostats, Heating, cooling, water heating, insulation, duct work, air sealing, lighting, and pool pumps.

[16] Estimated 2022 Budgets are based on 2021 Annual Budget Advice Letter (ABAL) filings. Final budget information for 2022 will be provided in program administrator 2022 ABAL filings on September 1, 2021.

[17] This total reflects the combined 2021 ABAL program budgets of three PG&E Residential P4P programs:

Table 2. SCE Summary of Comparable Programs

IOU Program Unique ID	Sector	Annual Budget [18]	Eligible Measures
SCE WE&T Integrated Energy Education & Training Program (formerly Centergies) **[SCE-13-SW-010A]**	Cross-cutting: WE&T	$3,850,000	Not applicable. Non-resource program
SCE C&S – Compliance Improvement **[SCE-13-SW-008C]**	Cross Cutting: C&S	$2,600,000	Not applicable. Non-resource program

- **[SCE-13-SW-001G]** $3,000,000Fan Delay Controller
- Duct Test and Seal
- Residential Smart Thermostat
- Faucet Aerators

Efficient Showerheads **SCE Willdan Third Party Program**	Residential	$6,300,000	• The program offers deemed, customized calculated, and NMEC-based site-specific approach measures for energy- saving equipment for both common and in-unit areas of multifamily properties; end uses include HVAC and Lighting,

Table 3. SoCalGas Summary of Comparable programs

IOU Program Unique ID	Sector	Annual Budget[1]	Eligible Measures
SCG3729 – WE&T-Integrated Energy Education Training (IEET)	Cross Cutting	$3,250,000	Not applicable.

Comfortable Home Rebates ($3,478,918), Home Intel ($667,404), Home Energy Rewards ($757,322)The 2022 budget will be provided in the 2022-2023 BBAL. .

[18] Estimated 2022 Budgets are based on 2021 Annual Budget Advice Letter (ABAL) filings. Final budget information for 2022 will be provided in program administrator 2022 ABAL filings on September 1, 2022.

[19] Estimated 2022 Budgets are based on 2021 Annual Budget Advice Letter (ABAL) filings. Final budget information for 2022 will be provided in program administrator 2022 ABAL filings on September 1, 2022.

SCG3726 – C&S-Compliance Enhancement	Cross Cutting	$582,000	Not applicable.
SCG3820 – RES-Direct Install Program	Residential		• Exhaust Venting (Kitchen/Bath) – cut opening with vent (Done in conjunction with attic insulation) • Vent – Eave (Done in conjunction with attic insulation) • Duct Repair – (Done in conjunction with attic insulation) • Duct Testing • Duct Sealing • Duct Board Installation • Low Flow Kitchen Faucet Aerator • Low Flow Bathroom Faucet Aerator • Low Flow Showerhead • Low Flow Handheld Showerhead • Showerhead adaptor
			• Shower Diverter Valve (in conjunction with Low Flow Showerhead) • Thermostatic Shower Valve • Smart Thermostat • Natural Gas Appliance Testing (NGAT) (done in conjunction with Duct Sealing)

APPENDIX B - WORKFORCE, EDUCATION, AND TRAINING CLASS LIST

Classes in Alignment with 3C-REN Focus Areas, Full Class List and On-demand Class List

2020 and 2021-to-date

A. Building Envelope

1. Advanced Framing for Energy and Resource Efficiency
2. Air Sealing and Insulating Existing Homes
3. Air Sealing to Achieve Zero Net Energy - New Techniques and Applications
4. Air Tight Buildings
5. Air-Sealing for an Efficient New Home
6. Attic-Roof Insulation and Air Sealing
7. Building Envelope Retrofit Strategies
8. Building Science 1.0: Overview and Introduction to Control Layers
9. Building Science 2.1: Introduction to Heat Transfer - 18DS
10. Building Science 2.2: Airtightness and Air Barriers - 18DS
11. Building Science 2.3: Understanding and Limiting Thermal Bridging - 18DS
12. Building Science 2.4: Introduction to Continuous Insulation and Cladding Attachment - 18DS
13. Building Science 2.5: Introduction to Windows, Curtain Walls, Window Walls and Shading Design - 18DS
14. Building Science 2.6: Introduction to Moisture and Buildings - 18DS
15. Building Science 2.7: Understanding the Psychrometrics of Condensation - 18DS
16. Building Science 2.8: Introduction to the Control of Rain and Groundwater Penetration - 18DS
17. Deep Energy Retrofits
18. Enclosure Systems and Materials: Architectural Precast
19. Enclosure Systems and Materials: Portland Cement Plaster on Framed Walls
20. Enclosure Systems and Materials: Unitized Curtainwall
21. High Performance Residential Enclosures for All-Electric, Climate Smart Homes
22. Home Energy Series: Session 2: Home Systems: Understanding Your Home’s Building Enclosure and its Major Systems
23. How to Design and Build High Performance Walls and Attics
24. Introduction to the Passive House Standard
25. Retrofitting Crawl Spaces for Health, Comfort, and Energy Efficiency
26. Window Selection and Replacement
27. Window Selection for New and Existing Homes

B. Energy Code and Standards

1. 2019 Title 24: Where We're Headed With the Nonresidential Standards
2. 2019 Title 24: Where We're Headed With the Residential Standards
3. The Quest for Performance and California Code Commissioning Requirements
4. The Quest for Performance and California Code Commissioning Requirements (Previously Recorded)
5. Title 24 Documentation for Architects: EUI, 2030 Goals, and Getting the Most from Consultants
6. Title 24 Documentation for Architects: EUI, 2030 Goals, and Getting the Most from Consultants (Previously Recorded)
7. Title 24 Proper Procedures for Charging Air Conditioners and Heat Pumps

8. Title 24: Where We're Headed with the 2019 Standards

C. HVAC/R

1. 3D Residential HVAC Design (No CAD Required)
2. A Class for Control Freaks: Getting the Most from your Building Automation System
3. ACCA (Air Conditioning Contractors of America) Residential Quality Installation Series
4. ACCA CCA Dry Climate Nonresidential Manual N, CS, and QD Series with Wright soft
5. ACCA Manual D - Duct Design
6. ACCA Manual D Part 1, Duct Design
7. ACCA Manual D Part 2, Duct Design with WrightSoft
8. ACCA Manual H, Residential Heat Pump, Design and Installation.
9. ACCA Manual J - Equipment Sizing and Selection
10. ACCA Manual J and S, Equipment Selection & Sizing
11. Advanced ACCA Manual D
12. Airflow Testing and Diagnostics - Online Live
13. Airflow Testing and Diagnostics Live Online
14. Balanced Ventilation for Better Health, Comfort, and Energy Efficiency
15. Basic Heating, Ventilating, & Air Conditioning
16. Best Practices in Residential Water Heating
17. Blower Door Testing
18. BPI Combustion Safety and Depressurization
19. CAQI/QM/QS AC/HP Refrigeration Module 1 - 4
20. Central Heat Pump Water Heating Engineering and Design Deep Dive
21. Centrifugal Pumps: Principles and Opportunities for Hydronic Systems
22. Chilled and Condenser Water Systems: Design, Performance, and Commissioning Issues
23. Combustion Safety and Efficiency
24. Commercial and Industrial Heat Pump Water Heating
25. Commercial QI ACCA Manual D, Q and T
26. Commercial QI ACCA N,CS
27. Commercial QI Advanced ACCA Manual N
28. Commercial Quality Maintenance and Installation of Economizers
29. Commercial System Performance - Online Live
30. Commissioning with Data
31. Control the Flow: A Comprehensive Look at Demand Controlled Commercial Kitchen Ventilation for the Decarbonized Kitchen
32. Cool It: How to Create More Comfortable Kitchens
33. Cooling Tower Efficiency – Two Day Series
34. Demand Control Ventilation (DCV) and Variable Speed Fans
35. Demand Control Ventilation (DCV) and Variable Speed Fans Non Residential.
36. Demythifying Heat Pumps for New Construction
37. Designing Commercial Spaces with Modern Ceiling Fans
38. Duct System Optimization - Online Live
39. Duct System Optimization Live Online Certification
40. Ductless Mini Split Design, Installation, & Performance
41. Ductless Mini Split Design, Installation, and Performance
42. Efficient Hot Water Systems for All-Electric, Climate Smart Homes
43. Electric Heat Pumps for Domestic Space and Water Heating
44. Electric Heat Pumps for Space Heating and Cooling
45. Energy Efficient Design and Retrofit of Laboratory Buildings
46. Energy Impact from ASHRAE COVID-19 HVAC Recommendations

47. Gas Heating CAQI/QM/QS
48. Heat Pump Technologies for Space Conditioning and Water Heating
49. High Performance Chilled Water Plant Design Workshop
50. Home Heating and Cooling Basics
51. HVAC Fundamentals: New Ideas for Novices
52. HVAC System Testing for Energy Efficiency
53. IAQ - How to Prepare your Commercial HVAC for Pandemics/Wildfires
54. IHACI Electrical Module 1 - 4
55. IHACI: NATE Training Part 3
56. IHACI: System Diagnostics Module 1 - 4
57. IHACI: System Performance Module 1 - 4
58. Implementing Heat Pumps Water Heaters in Replacement Scenarios: Why They Make Sense
59. MI-BEST Air Flow Measures and Static Pressure-Day 2; Building Energy Science, Building Performance Made Practical
60. MI-BEST Building Envelope and Duct Testing-Day 1; Building Energy Science, Building Performance Made Practical
61. MI-BEST Building Pressures and Ventilation Verification Day 4; Building Energy Science, Building Performance Made Practical
62. MI-BEST Day 3 Refrigerant Charge Verification
63. MI-BEST Day 5 Thermal By-pass, Quality Insulation Installation, Advanced Building Envelope
64. NATE HVAC Support Training Part 2
65. NATE HVAC/R New Hire Module 1-4
66. NATE HVAC/R Support Training Part 4
67. NATE HVAC-R New Hire
68. NATE HVAC-R Support Training
69. Optimizing Residential Forced-Air HVAC Systems
70. Optimizing Restaurant Ventilation for Summer Comfort and COVID-19 Safety
71. Overcoming Installation Challenges for Heat Pump Water Heater Retrofits
72. Overcoming Installation Challenges for Heat Pumps in HVAC Retrofits
73. Packaged HVAC: Economizers, Compressors, Analysis
74. Power, Energy and Therms: Fundamental Concepts, Monitoring Techniques and Load Disaggregation
75. RCx101 Identifying and Assessing Common Retro-Cx Opportunities
76. RCx101: Identifying and Assessing Common Retro-Cx Opportunities (Previously recorded)
77. Residential Energy Auditing
78. Residential Heat Pumps: Quality Design and Installation
79. Residential Heating and Air Conditioning for All-Electric, Climate Smart Homes
80. Selling Heat Pumps for HVAC Retrofits: System Efficiencies, Costs, and Why They're Ideal for California
81. The Benefits and Challenges of R290 as a Refrigerant

D. Other: Integrated Building Design, Renewable Energy, Software, Water and Energy
1. All-Electric Climate Smart Homes: Design Thinking for Owners, Designers, and Builders
2. Analysis of MWELO: Is It Working?
3. Analysis of MWELO: Is It Working? (Previously Recorded) Water Conservation Showcase
4. At the Frontiers of Sustainable Urban Housing (Previous Recording)
5. At the Frontiers of Sustainable Urban Housing (Previously Recorded)
6. Basic Excel for Energy Auditors

7. Basics of Photovoltaic (PV) & Energy Storage Systems (ESS) for Grid-Tied Applications
8. Basics of Photovoltaic (PV) Systems for Grid-Tied Applications
9. Basics of Solar Electric Systems
10. Building Behavior: How to Optimize Building Operations through Engagement
11. Building Envelope Retrofit Strategies
12. Carbon Free Homes: Features, Benefits, Valuation
13. Carbon Sequestration in the Landscape Series: #1 Nurture Soil to Sequester Carbon
14. Carbon Sequestration in the Landscape Series: #2 Protect Water & Air Quality to Reduce Emissions
15. Carbon Sequestration in the Landscape Series: #3 Save Water for Climate Resilience
16. Carbon Sequestration in the Landscape Series: #4 - Act Local to Mitigate Climate Change (Previously Recorded)
17. Clean Energy Homes: Key Systems & Energy Modeling
18. Daylighting Metrics
19. Decarbonizing Building Operations: Policy, Strategy and Technology
20. Decarbonizing the Built Environment
21. Design Professional's Guide to Zero Net Energy Buildings (Previously Recorded)
22. Design Strategies for New Buildings
23. Economics of Rooftop Solar and Storage
24. Effective Hot Water Design for Commercial Kitchens
25. Electric Vehicles (EVs): What you need to know
26. Emerging Technologies in the Water Sector
27. Emerging Technologies in the Water Sector (Previously Recorded) Water Conservation Showcase
28. Energy Efficiency and Solar For Homeowners
29. Energy Efficiency Update: Strategies for Reducing Energy Use, Operating Costs and Carbon Emissions at Commercial Facilities
30. Factors in Daylighting Analysis
31. Home Energy Series: Session 3: Home Energy: Creating Your Whole Home- Based Solar Strategy
32. How to Build Your Career in the Water Industry
33. How to Build Your Career in the Water Industry (Previously Recorded) Water Conservation Showcase
34. Inspecting Photovoltaic (PV) Systems for Code Compliance
35. Integrated Design for Non-Residential and Multi-Unit Residential: Overcoming Design and Management Challenges
36. Integrated Design Process: How to Use Whole-Building Performance Energy Targets During Design
37. Integrated Design Process: Overcoming Design and Management Challenges
38. Integrated Design Process: Project Goals and Metrics - How to Establish Them, Assess Success and Keep on Track
39. Integrated Design Process: Projects of All Sizes and Delivery Methods
40. Irrigation System Performance
41. Kicking Carbon Out of Buildings - Design for Decarbonized Buildings
42. Laundry to Landscape
43. Laundry to Landscape (Previously Recorded) Water Conservation Showcase
44. Model Water Efficient Landscape Ordinance (MWELO) and the New Normal for California Landscaping
45. Model Water Efficient Landscape Ordinance (MWELO) and the New Normal for California Landscaping (Previously Recorded)

46. New California Conservation Framework
47. New California Conservation Framework (Previously Recorded) Water Conservation Showcase
48. Pathways to a Zero Net Energy Home
49. Photovoltaic (PV) Site & Energy Storage Systems (ESS) Analysis and System Sizing
50. Photovoltaic (PV) Site Analysis and System Sizing
51. Plant Talk
52. Plant Talk (Previously Recorded) Water Conservation Showcase
53. PV + Batteries: Integrating Storage with Grid-Tied Photovoltaic Systems
54. Qualified Water Efficient Landscaper (QWEL) Certification Program
55. Qualified Water Efficient Landscaper (QWEL) Certification Program (Previously Recorded) Water Conservation Showcase
56. Re-designing Good Design: High-performance Architecture for a Low-carbon World (Previously Recorded)
57. Solar + Batteries for Homeowners
58. Solar PV: Technology and Valuation
59. Stormwater Bioretention Systems
60. Stormwater Bioretention Systems (Previously Recorded) Water Conservation Showcase
61. The Architecture 2030 ZERO Code and California (Previously Recorded)
62. The California State of Onsite Water Reuse
63. The California State of Onsite Water Reuse (Previously Recorded) Water Conservation Showcase
64. Using Building Energy Simulation
65. Water and Energy Nexus: Applications and Outcomes
66. Water and Energy Nexus: Applications and Outcomes (Previously Recorded) Water Conservation Showcase
67. Water Audit Basics for Small to Medium Size Businesses
68. Watersheds as Engagement Tool
69. Watersheds as Engagement Tool (Previously Recorded) Water Conservation Showcase
70. Workshop: Smart Controllers-Wi-Fi Controllers - Secrets to Success
71. Workshop: Smart Controllers-Wi-Fi Controllers - Secrets to Success (Previously Recorded) Water Conservation Showcase
72. Zero Net Energy Design Residential
73. Zero Net Energy Introduction & Project Showcase

A. Building Envelope
1. Advanced Framing for Energy and Resource Efficiency
2. Air Sealing and Insulating Existing Homes
3. Air-Sealing for an Efficient New Home
4. Air Sealing to Achieve Zero Net Energy - New Techniques and Applications
5. AirTight Buildings
6. Attic-Roof Insulation and Air Sealing
7. Building Envelope Retrofit Strategies
8. Building Science 1.0 Overview and Introduction to Control Layers
9. Building Science 2.1 Introduction to Heat Transfer - 18DS
10. Building Science 2.2 Airtightness and Air Barriers - 18DS
11. Building Science 2.3 Understanding and Limiting Thermal Bridging - 18DS

12. Building Science 2.4 Introduction to Continuous Insulation and Cladding Attachment - 18DS
13. Building Science 2.5 Introduction to Windows, Curtain Walls, Window Walls and Shading Design - 18DS
14. Building Science 2.6 Introduction to Moisture and Buildings - 18DS
15. Building Science 2.7 Understanding the Psychrometrics of Condensation - 18DS
16. Building Science 2.8 Introduction to the Control of Rain and Groundwater Penetration - 18DS
17. Continuous Exterior Insulation and Moisture Management - Buildings with Steel and Concrete Structural Systems
18. Continuous Exterior Insulation and Moisture Management - Buildings with Wood Structural Systems
19. Deep Energy Retrofits
20. Design Strategies for New Buildings
21. Enclosure Systems and Materials: Architectural Precast
22. Enclosure Systems and Materials: Portland Cement Plaster on Framed Walls
23. Enclosure Systems and Materials: Unitized Curtainwall
24. Energy Efficient Windows
25. High Performance Crawl Spaces: A Practical Approach to Air Sealing and Insulating
26. High Performance Prefabricated Building
27. How to Design High-Performance Walls and Attics
28. How to Design and Build High Performance Walls and Roofs
29. Insulation Overview: Selection & Installation
30. Retrofitting Crawl Spaces for Health, Comfort, and Energy Efficiency
31. The Benefits of Airtightness Testing for Multi-Family and Nonresidential Buildings: Lessons from Seattle
32. The Building as a System
33. Wall Insulation: Methods and Materials
34. Window Selection and Replacement
35. Window Selection for New and Existing Homes

B. Energy Code and Standards
36. 2019 Title 24: Where We're Headed With the Nonresidential Standards
37. 2019 Title 24: Where We're Headed With the Residential Standards
38. Title 24 Proper Procedures for Charging Air Conditioners and Heat Pumps
39. Title 24: Where We Are Headed with 2016 Non-Residential Standards
40. Title 24: Where We Are Headed with the 2016 Residential Standards

C. HVAC/R
41. ACCA (Air Conditioning Contractors of America) Residential Quality Installation Series
42. ACCA Manual D - Duct Design
43. ACCA Manual J - Equipment Sizing and Selection
44. Advanced ACCA Manual D
45. Ag./Industrial Refrigeration Systems Efficiency
46. Air Conditioning and Heat Pump Refrigeration Module by IHACI: Session 1,2,3,4
47. Air Distribution Module by IHACI: Session 1-4
48. Air Flow Measures and Static Pressure - MI-BEST Series, Day 1-2
49. Balanced Ventilation for ZNE and High-Performance Homes
50. Blower Door Testing
51. BPI Combustion Safety and Depressurization
52. Building Envelope and Duct Testing - MI-BEST Series
53. Building Pressures and Ventilation Verification - MI-BEST Series
54. Centrifugal Pumps: Principles and Opportunities for Hydronic Systems
55. Combustion Safety and Efficiency
56. Commercial HVAC/R Introduction Module by IHACI
57. Commercial Quality Maintenance and Installation of Economizers
58. Demand Control Ventilation (DCV) and Variable Speed Fans
59. Centrifugal Pumps: Principles and Opportunities for Hydronic Systems
60. Commercial QI ACCA N,CS
61. Commercial QI ACCA Manual D, Q and T
62. Commercial QI Advanced ACCA Manual N
63. Demand Control Ventilation (DCV) and Variable Speed Fans
64. Duct Airtightness Testing
65. Duct Efficiency Improvement
66. Electric Heat Pumps for Domestic Space and Water Heating: Applications and Considerations
67. Electric Module by IHACI
68. Energy Efficient Design and Retrofit of Laboratory Buildings
69. Forced-Air Systems: Quality Control
70. Gas Heating Module by IHACI
71. Heat Pump Technologies for Space Conditioning and Water Heating
72. Heat Pumps: Residential Applications and Comparison with Solar Energy Systems
73. High Performance Chilled Water Plant Design Workshop
74. Home Heating and Cooling Basics
75. HVAC Fundamentals: New Ideas for Novices
76. HVAC Quality Service
77. HVAC/R New Hire Module by IHACI
78. Integrated Enclosure and HVAC/Plumbing Design for High Performance Multi-Unit Residential Buildings (MURBS)
79. Low Cost Cooling
80. NATE HVAC/R Support by IHACI
81. NATE Training Series by IHACI
82. Optimizing Residential Forced - Air HVAC Systems
83. Optimizing Residential HVAC System Performance
84. Power, Energy and Therms: Fundamental Concepts, Monitoring Techniques and Load Disaggregation
85. Refrigerant Charge Verification - MI-BEST Series

86. Residential Heat Pumps: Quality Design and Installation
87. Residential Indoor Air Quality (IAQ) & Ventilation
88. System Diagram Workshop
89. Thermal By-Pass, Quality Insulation Installation, Advanced Building Envelope - MI-BEST Series

D. Other: Integrated Building Design, Renewable Energy, Software, Water and Energy
90. Basic Excel for Energy Auditors
91. Basics of Photovoltaic (PV) Systems for Grid-Tied Applications
92. Basics of Solar Electric Systems
93. CSI Thermal Program Contractor Workshop
94. Demand Response: Basic Concepts, Programs, and Site Assessment
95. Design Strategies for New Buildings
96. Economics of Rooftop Solar: NABCEP Certified course
97. Energy Plus for Energy Modeling Practitioners
98. Financing Fundamentals for Solar Energy Projects
99. Integrated Design Process: How to Use Whole-Building Performance Energy Targets During Design
100. Integrated Design Process: Overcoming Design and Management Challenges
101. Integrated Design Process: Project Goals and Metrics How to Establish Them, Assess Success and Keep on Track
102. Integrated Design Process: Projects of All Sizes and Delivery Methods
103. Integrated Design: Mastering the Project Management Process
104. Integrated Design Thinking for Zero Net Energy Residential Buildings
105. Inspecting Photovoltaic (PV) Systems for Code Compliance
106. Maximizing Energy Storage Through Software
107. Microgrids: Basic Applications, Technologies, Value and Economics
108. PG&E Rates and Tariffs: Essential Information for Energy Projects
109. Photovoltaic (PV) Site Analysis and System Sizing
110. PV + Batteries: Integrating Storage with Grid-Tied Photovoltaic Systems
111. Setting Priorities in Energy Upgrades to Existing Wood-Framed Residential and Small Nonresidential Buildings
112. Solar PV: Technology and Valuation
113. Solar Water Heating Systems: Residential and Commercial
114. Universal Translator (UT3) Workshop: Software Demonstration and Interactive Lab
115. Using Building Energy Simulation
116. Water Audit Basics for Small to Medium Size Businesses
117. Zero Net Energy Introduction & Project Showcase

Full Class List

1. 2020 Foodservice Forecast
2. 2021 Foodservice Forecast
3. 3D Residential HVAC Design (No CAD Required) - Part 1
4. 3D Residential HVAC Design (No CAD Required) - Part 2
5. A Class for Control Freaks: Getting the Most from your Building Automation System
6. A Tool Day Workshop
7. ACCA CCA Dry Climate Nonresidential Manual N, CS, and QD Series with Wright soft
8. ACCA Manual D Duct Design
9. ACCA Manual D Part 1, Duct Design
10. ACCA Manual D Part 2, Duct Design with WrightSoft
11. ACCA Manual H, Residential Heat Pump, Design and Installation.
12. ACCA Manual J and S, Equipment Selection & Sizing
13. ACCA Manual J Equipment Selection and Sizing
14. Advanced ACCA Manual D
15. Advanced Concepts in Designing and Retrofitting Energy Efficient Data Centers (Simulcast)
16. Advanced Framing for Energy and Resource Efficiency
17. Advanced Tool Day Workshop
18. Ag Irrigation Technology Virtual Field Day
19. Air Sealing and Insulating Existing Homes
20. Air Sealing to Achieve Zero Net Energy - New Techniques and Applications
21. Airflow Testing and Diagnostics - Online Live
22. Airflow Testing and Diagnostics Live Online (Two-part class)
23. All-Electric ADU's: A Realtor's Edge
24. All-Electric Climate Smart Homes: Design Thinking for Owners, Designers, and Builders
25. Amber Mahone: The Challenge of Retail Gas in California's Low-Carbon Future
26. Balanced Ventilation for Better Health, Comfort, and Energy Efficiency
27. Basic Excel for Energy Auditors
28. Basic Heating, Ventilating, & Air Conditioning
29. Basic Pump Efficiency in English
30. Basic Pump Efficiency translated to Hmong
31. Basic Pump Efficiency translated to Spanish
32. Basics of Photovoltaic (PV) & Energy Storage Systems (ESS) for Grid-Tied Applications (2-day class)
33. Basics of Photovoltaic (PV) Systems for Grid-Tied Applications
34. Best Practices - Lighting Audits (2-day class)
35. Best Practices for Lighting Retrofits
36. Best Practices for Outdoor Lighting
37. Best Practices in Industrial Lighting
38. Best Practices in Office Lighting
39. Building Behavior: How to Optimize Building Operations through Engagement
40. Calculating Photometric Lighting Solutions
41. Cancelled: Explore HVAC Field Performance Live Online
42. CAQI/QM/QS AC/HP Refrigeration Module 1
43. CAQI/QM/QS AC/HP Refrigeration Module 2
44. CAQI/QM/QS AC/HP Refrigeration Module 3
45. CAQI/QM/QS AC/HP Refrigeration Module 4
46. Carbon Free Homes: Features, Benefits, Valuation
47. Carbon Sequestration in the Landscape Series: #1 Nurture Soil to Sequester Carbon
48. Carbon Sequestration in the Landscape Series: #2 Protect Water & Air Quality to Reduce

Emissions
49. Carbon Sequestration in the Landscape Series: #3 Save Water for Climate Resilience
50. Carbon Sequestration in the Landscape Series: #4 - Act Local to Mitigate Climate Change
51. Carbon Sequestration in the Landscape Series: #5 - Conserve Energy to Reduce GHG's
52. Carbon Sequestration in the Landscape Series: #6Reduce Waste to Reduce Greenhouse Gas Emissions
53. Case Studies for Calculating Lighting Solutions
54. Central Heat Pump Water Heating Engineering and Design Deep Dive
55. Chilled and Condenser Water Systems: Design, Performance, and Commissioning Issues
56. Clean Energy Homes: Key Systems & Energy Modeling
57. Commercial and Industrial Heat Pump Water Heating - Part 1 and 2
58. Commercial QI ACCA Manual D, Q and T
59. Commercial QI ACCA N,CS
60. Commercial QI Advanced ACCA N
61. Commercial Quality Maintenance and Installation of Economizers
62. Commercial Quality Maintenance and Installation of Economizers (2-day class)
63. Commercial System Performance - Online Live Certification
64. Commercial System Performance - Online Live Certification Day 2
65. Commercial System Performance - Online Live Certification Day 3
66. Commercial System Performance - Online Live Certification Day 4
67. Commissioning with Data
68. Comparing and Selecting a Lighting Controls System
69. Comparing and Selecting an Advanced Lighting Controls System
70. Cook, Hold & Chill: Equipment and Techniques that Save Energy, Reduce Waste and Cut Labor Costs
71. Cool It: How to Create More Comfortable Kitchens
72. Cooling Tower Efficiency – Two Day Series
73. Cooling Tower Efficiency – Two Day Series Day 2
74. Daylighting Metrics
75. Decarbonizing Building Operations: Policy, Strategy and Technology (2 Day Class)
76. Decarbonizing the Built Environment
77. Decarbonizing the Commercial Kitchen with Energy Efficient Equipment
78. Demand Control Ventilation (DCV) and Variable Speed Fans
79. Demand Control Ventilation (DCV) and Variable Speed Fans Non Residential.
80. Demand Response for Commercial/Industrial Facilities
81. Demythifying Heat Pumps for New Construction
82. Designing Commercial Spaces with Modern Ceiling Fans
83. Designing for Light and Health - What You Need to Know
84. DLC Advanced Lighting Controls Systems
85. Duct System Optimization - Online Live Certification
86. Duct System Optimization - Online Live Certification Day 2
87. Duct System Optimization - Online Live Certification Day 3
88. Duct System Optimization - Online Live Certification Day 4
89. Duct System Optimization Live Online Certification (4 Part Series)
90. Ductless Mini Split Design, Installation, & Performance
91. Ductless Mini Split Design, Installation, and Performance
92. EBCx Workshop and Project Review
93. Economics of Rooftop Solar and Storage
94. Effective Hot Water Design for Commercial Kitchens
95. Efficient Hot Water Systems for All-Electric, Climate Smart Homes
96. Electric Heat Pumps for Domestic Space and Water Heating
97. Electric Heat Pumps for Space Heating and Cooling
98. Enclosure Systems and Materials: Architectural Precast

99. Enclosure Systems and Materials: Portland Cement Plaster on Framed Walls
100. Enclosure Systems and Materials: Unitized Curtainwall
101. Energy and The Circular Economy
102. Energy Audit Bootcamp
103. Energy Audit Report Writing Workshop: Conveying Value to Customers
104. Energy Audit Skills: Tools, Data Collection Techniques, and Calculations
105. Energy Auditing Techniques for Small & Medium Commercial Facilities (3 Day Class)
106. Energy Efficiency 101 for Culinary Students
107. Energy Efficiency and Solar For Homeowners
108. Energy Efficiency Update: Strategies for Reducing Energy Use, Operating Costs and Carbon Emissions at Commercial Facilities
109. Energy Efficient Design and Retrofit of Laboratory Buildings
110. Energy Impact from ASHRAE COVID-19 HVAC Recommendations
111. Evaluating and Selecting Luminaires
112. Explore HVAC Field Performance - Online Live
113. Exploring Ventless Technologies: High Tech Equipment for Modular Kitchen
114. Factors in Daylighting Analysis
115. Field Data Collection for Lighting Audits and Retrofits
116. Fundamental Concepts in Operating and Retrofitting Energy Efficient Data Centers
117. Gas Heating CAQI/QM/QS (2-day class)
118. Getting Started With a Lighting Replacement Project
119. Graphic Representation of Data: Making Charts that Matter
120. Heat Recovery Dishmachines and Heat Pump Water Heaters: The Hidden Keys to a Zero Net Carbon Kitchen
121. High Performance Chilled Water Plant Design Workshop
122. High Performance Residential Enclosures for All-Electric, Climate Smart Homes
123. Home Energy Series: Session 1 - Home Evaluation: Understanding Your Home's Energy Usage and Your Utility Bill
124. Home Energy Series: Session 2: Home Systems: Understanding Your Home's Building Enclosure and its Major Systems
125. Home Energy Series: Session 3: Home Energy: Creating Your Whole Home- Based Solar Strategy
126. Home Performance for Home Buyers and Real Estate Professionals
127. How to Design High-Performance Walls & Attics
128. HVAC Fundamentals: New Ideas for Novices (2 Day Class)
129. HVAC Fundamentals: New Ideas for Novices (Day 2 of 2)
130. HVAC System Testing for Energy Efficiency
131. HVAC System Testing for Energy Efficiency DAY 2
132. HVAC System Testing for Energy Efficiency DAY 3
133. IAQ - How to Prepare your Commercial HVAC for Pandemics/Wildfires
134. Identifying Existing Lighting Technologies - Knowing What to Replace and How
135. IES Intermediate 10-Class Series: Quality Energy Efficient Lighting
136. IES Intermediate 10-Class Series: Quality Energy Efficient Lighting (Module 2)
137. IES Intermediate 10-Class Series: Quality Energy Efficient Lighting (Module 3)
138. IES Intermediate 10-Class Series: Quality Energy Efficient Lighting (Module 4)
139. IES Intermediate 10-Class Series: Quality Energy Efficient Lighting (Module 5)
140. IES Intermediate 10-Class Series: Quality Energy Efficient Lighting (Module 6)
141. IES Intermediate 10-Class Series: Quality Energy Efficient Lighting (Module 7)
142. IES.PEC Fundamentals of Lighting - 9 Class Series
143. IES.PEC Fundamentals of Lighting - 9 Class Series - Module 3 - Luminaires
144. IES.PEC Fundamentals of Lighting - 9 Class Series Module 4 - Controls and Commissioning - Phil Catalano
145. IES.PEC Fundamentals of Lighting - 9 Class Series - Module 6 - Photometry, Calculations and Rendering

146. IES.PEC Fundamentals of Lighting - 9 Class Series Module 5 - Daylighting and Sustainability
147. IES.PEC Fundamentals of Lighting - 9 Class Series Module 7 - Codes & Standards
148. IES.PEC Fundamentals of Lighting - 9 Class Series Module 8 - Lighting for Interiors
149. IES.PEC Fundamentals of Lighting (9 of 9) Module 9 - Lighting for Exteriors
150. IHACI Electrical Module 1
151. IHACI Electrical Module 2
152. IHACI Electrical Module 3
153. IHACI Electrical Module 4
154. IHACI: NATE Training Part 1
155. IHACI: NATE Training Part 2
156. IHACI: NATE Training Part 3
157. IHACI: System Diagnostics Module 1
158. IHACI: System Diagnostics Module 2
159. IHACI: System Diagnostics Module 3
160. IHACI: System Performance Module 1
161. IHACI: System Performance Module 2
162. IHACI: System Performance Module 3
163. IHACI: System Performance Module 4
164. IHACI: Systems Diagnostics Module 4
165. Implementing Heat Pumps Water Heaters in Replacement Scenarios: Why They Make Sense
166. Industrial Lighting Workshop
167. Inspecting Photovoltaic (PV) Systems for Code Compliance
168. Integrated Design for Non-Residential and Multi-Unit Residential: Overcoming Design and Management Challenges
169. Integrated Design Process: How to Establish Project Goals and Metrics, Assess Success and Stay on Track
170. Integrated Design Process: How to Use Whole-Building Performance Energy Targets During Design
171. Integrated Design Process: Overcoming Design and Management Challenges
172. Integrated Design Process: Projects of All Sizes and Delivery Methods
173. Introduction to Automation of Buildings and Industrial Facilities using PLCs
174. Introduction to Programmable Logic Controllers: Energy Efficiency Applications
175. Introduction to the Passive House Standard
176. Irrigation System Field Maintenance
177. Irrigation System Performance
178. Kicking Carbon Out of Buildings - Design for Decarbonized Buildings
179. Lighting Controls Overview and Manufacturers' Demos
180. Lighting Fundamentals
181. Lighting Fundamentals - Part 1: Terminology, Vision and Color
182. Lighting Fundamentals - Part 2: Light Sources, Luminaires and Controls
183. Lighting Fundamentals - Part 3: Light Measurement, Codes & Standards
184. Measurement and Verification (M&V) and Normalized Metered Energy Consumption (NMEC)
185. Model Water Efficient Landscape Ordinance (MWELO) and the New Normal for California Landscaping
186. NATE HVAC Support Training Part 2
187. NATE HVAC/R New Hire Module 1
188. NATE HVAC/R New Hire Module 2
189. NATE HVAC/R New Hire Module 3
190. NATE HVAC/R New Hire Module 4
191. NATE HVAC/R Support Training Part 1
192. NATE HVAC/R Support Training Part 4 (NATE EXAM)
193. NATE HVAC-R New Hire
194. NATE HVAC-R Support Training

195. Needs, Wants and Expectations: A Panel Discussion on Building Commissioning (Cx) Services
196. Normalized Metered Energy Consumption (NMEC) Calculator Demonstrations
197. Normalized Metered Energy Consumption (NMEC) Calculator Demonstrations: AESC's Praxis
198. Normalized Metered Energy Consumption (NMEC) Calculator Demonstrations: Bill Koran's ECAM
199. Normalized Metered Energy Consumption (NMEC) Calculator Demonstrations: Cascade Energy's Energy Sensei platform
200. Normalized Metered Energy Consumption (NMEC) Calculator Demonstrations: EnergyRM's Insights, DeltaMeter and Transactions
201. Normalized Metered Energy Consumption (NMEC) Calculator Demonstrations: Enpira's Building Portfolios
202. Normalized Metered Energy Consumption (NMEC) Calculator Demonstrations: Evergreen's AMICS Tool
203. Normalized Metered Energy Consumption (NMEC) Calculator Demonstrations: kW Engineering's nmecr
204. Normalized Metered Energy Consumption (NMEC) Calculator Demonstrations: Recurve's Resource Planner, Fleet Manager and Flex Ledger
205. Optimizing Residential Forced-Air HVAC Systems
206. Optimizing Restaurant Ventilation for Summer Comfort and COVID-19 Safety
207. Outdoor Lighting Workshop
208. Overcoming Installation Challenges for Heat Pump Water Heater Retrofits
209. Overcoming Installation Challenges for Heat Pumps in HVAC Retrofits
210. Packaged HVAC: Economizers, Compressors, Analysis
211. Pathways to a Zero Net Energy Home
212. Performance-Based Selling Online Live Class
213. Performance-Based Selling Online Live Class Day 2
214. Performance-Based Selling Online Live Class Day 3
215. Performance-Based Selling Online Live Class Day 4
216. Photovoltaic (PV) Site & Energy Storage Systems (ESS) Analysis and System Sizing
217. Photovoltaic (PV) Site Analysis and System Sizing
218. Power, Energy and Therms: Fundamental Concepts, Monitoring Techniques and Load Disaggregation
219. Preparation for Lighting Controls Success - Using a BOD (Basis of Design) and a SOO (Sequence of Operations)
220. PV + Batteries: Integrating Storage with Grid-Tied Photovoltaic Systems
221. Radiant Cooling and Heating Systems for Large Commercial Buildings
222. RCx101: Identifying and Assessing Common Retro-Cx Opportunities
223. Remote Monitoring of Pump and Well Part 1
224. Remote Monitoring of Pump and Well Part 2
225. Remote Well and Pump Monitoring using the Smart Meter
226. Residential Heat Pumps: Quality Design and Installation
227. Residential Heating and Air Conditioning for All-Electric, Climate Smart Homes
228. Restaurant Rebound - Operating an Energy Efficient Kitchen
229. Retrofitting Crawl Spaces for Health, Comfort, and Energy Efficiency
230. Retrofitting Homes for Electrification and Decarbonization
231. Selecting Retrofit or Replacement Lighting
232. Selling Heat Pumps for HVAC Retrofits System Efficiencies, Costs, and Why They're Ideal for California
233. Selling Heat Pumps for HVAC Retrofits: System Efficiencies, Costs, and Why They're Ideal for California
234. Selling High Performance Homes: How Realtors earn stellar referrals while boosting profits
235. Series Overview: IES Intermediate 10-Part Quality Energy Efficient Lighting Series
236. Solar + Batteries for Homeowners

237. Solar PV: Technology and Valuation
238. Specifying Efficient Equipment for Production Kitchens
239. Testing Range Tops: Anatomy of a Test Method and Range Performance Comparisons
240. The Benefits and Challenges of R290 as a Refrigerant
241. The Quest for Performance and California Code Commissioning Requirements
242. Title 24 Documentation for Architects: EUI, 2030 Goals, and Getting the Most from Consultants
243. Title 24 Proper Procedures for Charging Air Conditioners and Heat Pumps
244. Tunable White Light - Pitfalls and Potential
245. Water Audit Basics for Small to Medium Size Businesses
246. Welcome to Facility Management
247. What is New with Ice Machine
248. Where are we with Integrating Lighting and Whole Building Controls?
249. Window Selection for New and Existing Homes
250. Zero Net Energy Design Residential

On-Demand Class List

1. 2019 Title 24: Where We're Headed With the Nonresidential Standards
2. 2019 Title 24: Where We're Headed With the Residential Standards
3. ACCA (Air Conditioning Contractors of America) Residential Quality Installation Series
4. Ag. Industrial Refrigeration Systems Efficiency (Previously Recorded)
5. Air Tight Buildings
6. Air-Sealing for an Efficient New Home
7. Analysis of MWELO: Is It Working?
8. Analysis of MWELO: Is It Working? (Previously Recorded) Water Conservation Showcase
9. At the Frontiers of Sustainable Urban Housing (Previous Recording)
10. At the Frontiers of Sustainable Urban Housing (Previously Recorded)
11. Attic-Roof Insulation and Air Sealing
12. Automation, EMS Systems, and PLCs
13. Basics of Solar Electric Systems
14. Best Practices in Residential Water Heating
15. Blower Door Testing
16. Building Envelope Retrofit Strategies
17. Building Science 1.0: Overview and Introduction to Control Layers
18. Building Science 2.1: Introduction to Heat Transfer - 18DS
19. Building Science 2.2: Airtightness and Air Barriers - 18DS
20. Building Science 2.3: Understanding and Limiting Thermal Bridging - 18DS
21. Building Science 2.4: Introduction to Continuous Insulation and Cladding Attachment - 18DS
22. Building Science 2.5: Introduction to Windows, Curtain Walls, Window Walls and Shading Design - 18DS
23. Building Science 2.6: Introduction to Moisture and Buildings - 18DS
24. Building Science 2.7: Understanding the Psychrometrics of Condensation - 18DS
25. Building Science 2.8: Introduction to the Control of Rain and Groundwater Penetration - 18DS
26. Carbon Sequestration in the Landscape Series: #1 Nurture Soil to Sequester Carbon
27. Carbon Sequestration in the Landscape Series: #4 - Act Local to Mitigate Climate

Change (Previously Recorded)
28. Combustion Safety and Efficiency
29. Deep Energy Retrofits
30. Design Professional's Guide to Zero Net Energy Buildings (Previously Recorded)
31. Design Strategies for New Buildings
32. Designing Commercial Spaces with Modern Ceiling Fans
33. DWR Overview of the New Conservation Framework
34. Electric Vehicles (EVs): What you need to know
35. Emerging Technologies in the Water Sector
36. Emerging Technologies in the Water Sector (Previously Recorded) Water Conservation Showcase
37. Energy Audit Bootcamp (2 Day Class)
38. Energy Audit Bootcamp Day 1 (Previously Recorded)
39. Energy Audit Bootcamp Day 2 (Previously Recorded)
40. Energy Efficiency 101 for Culinary Students: Mission College
41. Energy Efficiency 101 for Culinary Students: Sacramento State
42. Energy Math
43. Heat Pump Technologies for Space Conditioning and Water Heating
44. Home Heating and Cooling Basics
45. How to Build Your Career in the Water Industry
46. How to Build Your Career in the Water Industry (Previously Recorded) Water Conservation Showcase
47. Induction Cooking and Holding - Energy Efficiency and Performance for Commercial Kitchens
48. Induction Cooking and Holding - Energy Efficiency and Performance for Residential Kitchens
49. Intermediate Cost Effectiveness
50. Introduction to Cost Effectiveness
51. Laundry to Landscape
52. Laundry to Landscape (Previously Recorded) Water Conservation Showcase
53. Model Water Efficient Landscape Ordinance (MWELO) and the New Normal for California Landscaping (Previously Recorded)
54. Needs, Wants and Expectations: A Panel Discussion on Building Commissioning (Cx) Services
55. Needs, Wants and Expectations: A Panel Discussion on Building Commissioning (Cx) Services (Previously recorded)
56. New California Conservation Framework
57. New California Conservation Framework (Previously Recorded) Water Conservation Showcase
58. NMEC 1: Measurement and Verification (M&V) and Normalized Metered Energy Consumption (Previously Recorded)
59. NMEC 2: Normalized Metered Energy Consumption 2 Calculator Demonstrations (Previously Recorded)
60. NMEC 3: Normalized Metered Energy Consumption: Calculator Demonstrations 1: kW Engineering’s nmecr - 01.21.2021 (Previously Recorded)
61. NMEC 4: Normalized Metered Energy Consumption: Calculator Demonstrations 2: Recurve's Resource Planner, Fleet Manager and Flex Ledger - 01.28.2021 (Previously Recorded)
62. NMEC 5: Normalized Metered Energy Consumption: Calculator Demonstrations 3: Cascade Energy’s Energy Sensei Platform - 02.02.2021 (Previously Recorded)

63. NMEC 6: Normalized Metered Energy Consumption: Calculator Demonstrations 4: AESC's Praxis - 02.04.2021 (Previously Recorded)
64. NMEC 7: Normalized Metered Energy Consumption: Calculator Demonstrations 5: Evergreen's AMICS Tool - 2.10.2021 (Previously Recorded)
65. On-Bill Financing for Project Developers
66. Plant Talk
67. Plant Talk (Previously Recorded) Water Conservation Showcase
68. Qualified Water Efficient Landscaper (QWEL) Certification Program
69. Qualified Water Efficient Landscaper (QWEL) Certification Program (Previously Recorded) Water Conservation Showcase
70. RCx101: Identifying and Assessing Common Retro-Cx Opportunities
71. RCx101: Identifying and Assessing Common Retro-Cx Opportunities (Previously recorded)
72. Re-designing Good Design: High-performance Architecture for a Low-carbon World (Previously Recorded)
73. Residential Energy Auditing
74. Stormwater Bioretention Systems
75. Stormwater Bioretention Systems (Previously Recorded) Water Conservation Showcase
76. The Architecture 2030 ZERO Code and California (Previously Recorded)
77. The California State of Onsite Water Reuse
78. The California State of Onsite Water Reuse (Previously Recorded) Water Conservation Showcase
79. The Quest for Performance and California Code Commissioning Requirements
80. The Quest for Performance and California Code Commissioning Requirements (Previously Recorded)
81. Title 24 Documentation for Architects: EUI, 2030 Goals, and Getting the Most from Consultants (Previously Recorded)
82. Using Building Energy Simulation
83. Water and Energy Nexus: Applications and Outcomes
84. Water and Energy Nexus: Applications and Outcomes (Previously Recorded) Water Conservation Showcase
85. Watersheds as Engagement Tool
86. Watersheds as Engagement Tool (Previously Recorded) Water Conservation Showcase
87. Where are we with Integrating Lighting and Whole Building Controls? (Previously Recorded)
88. Window Selection and Replacement
89. Workshop: Smart Controllers-Wi-Fi Controllers - Secrets to Success
90. Workshop: Smart Controllers-Wi-Fi Controllers - Secrets to Success (Previously Recorded) Water Conservation Showcase
91. Zero Net Energy Introduction & Project Showcase

SCE Full Class List:

1. 2019 Residential & Nonresidential Energy Compliance: Let's Talk About HERS Measures (WEBINAR)
2. 2019 Residential & Nonresidential Energy Compliance: Let's Talk About Renewable Energy (WEBINAR)
3. 2019 Residential Energy Compliance: Let's Talk About Quality Insulation Installation (QII) (WEBINAR)
4. 2019 Residential Energy Compliance: Let's Talk About Design to Construction (WEBINAR)
5. 2019 Title 24 Requirements for Non-Residential Lighting (WEBCAST)
6. 2019 Title 24 Requirements for Residential Lighting (WEBCAST)
7. 2020 Foodservice Forecast -Step into the Future
8. 3D Residential HVAC Design (No CAD Required) - Part 1 (WEBCAST)
9. 3D Residential HVAC Design (No CAD Required) - Part 2 (WEBCAST)
10. A Tool Day Workshop (WEBINAR)
11. ACCA Manual H, Residential Heat Pump, Design and Installation (WEBCAST)
12. ACCA Manual J and S, Equipment Selection & Sizing (WEBCAST)
13. ADR 101: Understanding Automated Demand Response
14. ADR 102: Automated Demand Response Deep Dive
15. Advanced Concepts in Designing and Retrofitting Energy Efficient Data Centers (WEBCAST)
16. Advanced Energy Management Strategies Part 1
17. Advanced Energy Management Strategies Part 2
18. Advanced EnergyPro 8 Non-Residential (WEBCAST)
19. Advanced EnergyPro 8 Residential (WEBCAST)
20. Advanced Framing for Energy and Resource Efficiency- (WEBINAR)
21. Advanced Framing for Energy and Resource Efficiency (WEBCAST)
22. Advanced Lighting Control Systems (Webinar – Skype)
23. Advanced Lighting Control Systems: No Longer Relays & Occ Sensors (WEBCAST)
24. Advanced Lighting Control Systems: No Longer Relays & Occupant Sensors (WEBCAST)
25. Advanced Tool Day Workshop (WEBINAR)
26. Ag Irrigation Technology Virtual Field Day - 3 hours Nitrogen Management Self-Certification CEUs/ 3 hours of Certified Crop Advisor CEUs
27. Air Sealing and Insulating Existing Homes (WEBCAST)
28. Air Sealing and Insulating Existing Homes (WEBINAR Only)
29. Air Sealing and Insulating Existing Homes: Addressing Common Hazards During Energy Upgrades (WEBCAST)
30. Air Sealing and Insulating Existing Homes: Creating Continuity in Ceiling Air Barrier (WEBCAST)
31. Air Sealing and Insulating Existing Homes: Interpreting and Prioritizing Infrared and Blower Door Results (WEBCAST)
32. Air Sealing and Insulating Existing Homes: Recessed Fixtures in Vented Attics (WEBCAST)
33. Air Sealing to Achieve Zero Net Energy - New Techniques and Applications (WEBCAST)
34. Air Sealing to Achieve Zero Net Energy - New Techniques and Applications (WEBINAR Only)
35. All-Electric Climate Smart Homes: Design Thinking for Owners, Designers, and Builders (WEBCAST)
36. ASHRAE COVID-19 HVAC Recommendations for Commercial and Residential

Buildings (WEBCAST)
37. ASHRAE COVID-19 HVAC Recommendations for Educational Buildings (WEBCAST)
38. ASHRAE COVID-19 Recommendation Review: HVAC Considerations for Reopening of Buildings (WEBCAST)
39. ASHRAE COVID-19 Recommendations Review: HVAC Considerations for Reopening of Buildings (WEBCAST)
40. Balanced Ventilation for Better Health, Comfort, and Energy Efficiency (WEBCAST)
41. Balanced Ventilation for Better Health, Comfort, and Energy Efficiency: System Types, Install Strategies, Duct Design and Critical Details (WEBCAST)
42. Basic Heating, Ventilating and Air Conditioning (HVAC)
43. Basic Heating, Ventilating and Air Conditioning (HVAC) (WEBCAST)
44. Basic Heating, Ventilating and Air Conditioning (HVAC) (WEBINAR)
45. Basic Practices for Lighting Retrofits (Webinar)
46. Basic Practices in Office Lighting (Webinar)
47. Basic Pump Efficiency
48. Basics of Photovoltaic (PV) & Energy Storage Systems (ESS) for Grid-Tied Applications (Part 1)
49. Basics of Photovoltaic (PV) & Energy Storage Systems (ESS) for Grid-Tied Applications (Part 2)
50. Basics of Photovoltaic (PV) Systems for Grid-Tied Applications (WEBCAST)
51. Beginning EnergyPro 8 Non-Residential (WEBCAST)
52. Beginning EnergyPro 8 Residential (WEBCAST)
53. Best Practices for Industrial Lighting (WEBCAST)
54. Best Practices for Outdoor Lighting (Webinar)
55. Calculating Photometric Lighting Solutions - Learning Units: BOC 3.5
56. Calculating Photometric Lighting Solutions (WEBINAR)
57. CALGreen Title 24 Part 11
58. CALGreen Title 24 Part 11 (WEBCAST)
59. California Advanced Lighting Controls Training Program – AT Technician: Lighting Acceptance Test Technician Certification Course - 2 Day Workshop
60. California Advanced Lighting Controls Training Program – AT Technician: Lighting Acceptance Test Technician Certification Course - Day 2 of 2
61. Carbon Free Homes: Features, Benefits, Valuation (Webinar – MS Teams)
62. Case Studies for Calculating Lighting Solutions - Learning Units 3.5 AIA-HSW / 3.5 BOC
63. Case Studies for Calculating Lighting Solutions (Webinar)
64. Central Heat Pump Water Heating Systems for Clinical and Hospital Settings (WEBCAST)
65. Central Heat Pump Water Heating Systems for Multifamily Buildings (WEBCAST)
66. Chilled and Condenser Water Systems: Design, Performance, and Commissioning Issues (WEBCAST)
67. Clean Energy Homes: Key Systems & Energy Modeling
68. Clean Energy Homes: Key Systems & Energy Modeling (WEBCAST)
69. Clean Energy Homes: Key Systems & Energy Modeling Santa Monica
70. Commercial QI ACCA D, Q and T (WEBINAR)
71. Commercial QI ACCA N, CS (WEBINAR)
72. Commercial QI Advanced ACCA N (WEBINAR)
73. Commissioning with Data (WEBINAR Only)
74. Cool It: How to Create More Comfortable Kitchens (Webinar)
75. CoolSave - Saving Energy in Grocery Refrigeration (WEBCAST)
76. Criteria for Building Automation Dashboards

77. Daylighting For Buildings
78. Daylighting Metrics (Webinar)
79. Decarbonizing the Built Environment Day 1 (WEBCAST)
80. Decarbonizing the Built Environment Day 2 (WEBCAST)
81. Demand Control Ventilation (DCV) and Variable Speed Fans Non-Residential (WEBCAST)
82. Demythifying Heat Pumps for New Construction (WEBCAST)
83. Designing for Light and Health - What You Need to Know (WEBCAST)
84. Don't Touch That Thermostat
85. Ductless Mini Split Design, Installation, & Performance (WEBCAST)
86. Economics of Rooftop Solar and Storage (WEBCAST)
87. Efficient Hot Water Systems for All-Electric, Climate Smart Homes (WEBCAST)
88. Electric Heat Pumps for Domestic Space and Water Heating (WEBCAST)
89. Electric Heat Pumps for Domestic Space and Water Heating (WEBINAR)
90. Electrical Safety for Residential/Small Business (WEBINAR)
91. Emergency Lighting and Power Systems: Codes, Circuits, Controls and Calculations (WEBCAST)
92. Emergency Lighting and Power Systems: Codes, Circuits, Controls and Calculations (Webinar – Skype)
93. Enclosure Systems and Materials: Architectural Precast - 2 AIA - HSW Learning Units
94. Enclosure Systems and Materials: Portland Cement Plaster on Framed Walls (WEBCAST)
95. Enclosure Systems and Materials: Unitized Curtain Wall (WEBCAST)
96. Enclosure Systems and Materials: Unitized Curtainwall (WEBCAST)
97. Energy and Financial Calculations for Lighting Retrofits
98. Energy Auditing Bootcamp – Part 1
99. Energy Auditing Bootcamp – Part 2
100. Energy Auditing Techniques for Small & Medium Commercial Facilities (3-Day Class)
101. Energy Auditing Techniques for Small & Medium Commercial Facilities (Day 2 of 3)
102. Energy Auditing Techniques for Small & Medium Commercial Facilities (Day 3 of 3)
103. Energy Efficiency and Solar for Homeowners
104. Energy Efficiency Update: Strategies for Reducing Energy Use, Operating Costs and Carbon Emissions at Commercial Facilities (WEBCAST)
105. Energy Efficient Design and Retrofit of Laboratory Buildings(WEBCAST)
106. Energy Impact from ASHRAE COVID-19 HVAC Recommendations (WEBCAST)
107. Energy Resiliency for Homes
108. Energy Resiliency for Non-Residential Facilities
109. Energy Savings through Process Improvement and Optimization
110. Evaluating and Selecting Luminaires (Webinar)
111. Evaluating and Selecting Luminaires -WEBINAR
112. Evaluating and Selecting Luminaires Workshop -WEBINAR
113. Evaluating Pump Efficiency Results with Pump Curves
114. Evening Lecture: Current and Future Role of Battery Energy Storage in California’s High Renewables/Low-Greenhouse Gas (GHG) Emissions Future (WEBINAR)
115. Field Data Collection for Lighting Audits and Retrofits
116. From Zero Net Energy (ZNE) to Zero Net Carbon (ZNC): Designing Nonresidential Buildings in California - Part 1 (WEBCAST)
117. From Zero Net Energy (ZNE) to Zero Net Carbon (ZNC): Designing Nonresidential Buildings in California - Part 2 (WEBCAST)
118. Full-Scale Induction for Commercial Kitchens
119. Fundamental Concepts in Operating and Retrofitting Energy Efficient Data Centers

(WEBCAST)
120. General NEM Interconnection Updates from SCE (SKYPE)
121. General Pump Maintenance, Operation and Troubleshooting
122. Grounding for Performance and Safety
123. Hands-on HVAC Training and Evaluation for Mechanical Acceptance Testing Technicians (MATT): Day 1 – MCH Forms 02a, 03, 05
124. Hands-on HVAC Training and Evaluation for Mechanical Acceptance Testing Technicians (MATT): Day 2 – MCH Forms 06 & 12
125. Heat Pumps in Retrofit Construction - Space Conditioning and Water Heating (WEBCAST)
126. Heat Recovery Dishmachines and Heat Pump Water Heaters: The Hidden Keys to a Zero Net Carbon Kitchen
127. High Performance Residential Enclosures for All-Electric, Climate Smart Homes (WEBCAST)
128. Hot New Induction Technology for Cooler Kitchens (Webinar)
129. Hot Water in the Restaurant (Webinar)
130. How to Design and Building High-Performance Walls
131. How to Design High-Performance Walls & Attics (WEBCAST)
132. How to Interpret Pump Efficiency Results and Tracking Pump Performance
133. How to Plan and Build Multifamily Passive House for Less (WEBCAST)
134. How to Revert to Pre-COVID-19 Hospital Conditions with OSHPD (WEBCAST)
135. How to Use Energy Efficient Countertop Equipment to Increase Production
136. HVAC - Chilled Water Systems & Cooling Towers Part 1 (WEBINAR)
137. HVAC - Chilled Water Systems & Cooling Towers Part 2 (WEBCAST)
138. IAQ - How to Prepare your Commercial HVAC for Pandemics/Wildfires (WEBCAST)
139. ICE-O-MATIC Ice Machine Service Training
140. Identifying Existing Lighting Technologies - Knowing What to Replace and How - Learning Units: 3.5 AIA - HSW
141. IHACI (CAQI/QM/QS) System Performance Module: Class 1 - Thermodynamics: Heat In Motion (WEBCAST)
142. IHACI (CAQI/QM/QS) System Performance Module: Class 2 - A Sub-System of the Building (WEBCAST)
143. IHACI (CAQI/QM/QS) System Performance Module: Class 3 - Heating System: Comfort with Energy Efficiency (WEBCAST)
144. IHACI (CAQI/QM/QS) System Performance Module: Class 4 - Cooling System: Comfort with Energy Efficiency (WEBCAST)
145. IHACI NATE AC/HP & Air Distribution Training Part 1 (WEBCAST)
146. IHACI NATE AC/HP & Air Distribution Training Part 2 (WEBCAST)
147. IHACI NATE AC/HP & Air Distribution Training Part 3 (WEBCAST)
148. IHACI NATE AC/HP & Air Distribution Training Part 4 (WEBCAST)
149. IHACI NATE Core & Gas Heating Training Part 1 (WEBCAST)
150. IHACI NATE Core & Gas Heating Training Part 2 (WEBCAST)
151. IHACI NATE Core & Gas Heating Training Part 3 (WEBCAST)
152. IHACI NATE Core & Gas Heating Training Part 4 (WEBCAST)
153. IHACI: (CAQI/QM/QS) AC/HP Refrigeration Part 1 - Practical Fundamentals and Theory of the Refrigeration Circuit (WEBCAST)
154. IHACI: (CAQI/QM/QS) AC/HP Refrigeration Part 2 - CAQI of Air Conditioning and Heat Pump Systems (WEBCAST)
155. IHACI: (CAQI/QM/QS) AC/HP Refrigeration Part 3 - CAQM of Air Conditioning and Heat Pump Systems (WEBCAST)
156. IHACI: (CAQI/QM/QS) AC/HP Refrigeration Part 4 - CAQS of Air Conditioning and

Heat Pump Systems (WEBCAST)

157. IHACI: (CAQI/QM/QS) Air Distribution Module Part 1 - Practical Fundamentals and Physical Properties of Air
158. IHACI: (CAQI/QM/QS) Air Distribution Module Part 1 - Practical Fundamentals and Physical Properties of Air (WEBCAST)
159. IHACI: (CAQI/QM/QS) Air Distribution Module Part 2 - Practical Fundamentals and Theory of Proper Air Distribution Design
160. IHACI: (CAQI/QM/QS) Air Distribution Module Part 2 - Practical Fundamentals and Theory of Proper Air Distribution Design (WEBCAST)
161. IHACI: (CAQI/QM/QS) Air Distribution Module Part 3 - Fundamental Theory and Techniques of Air Side Design and Installation (WEBCAST)
162. IHACI: (CAQI/QM/QS) Air Distribution Module Part 3 - Practical Fundamental Theory and Techniques of Air Side Design and Installation (WEBCAST)
163. IHACI: (CAQI/QM/QS) Air Distribution Module Part 4 - Advanced Theory and Techniques of Air Side Design and Installation (WEBCAST)
164. IHACI: (CAQI/QM/QS) Electrical Module Part 1 - Practical Fundamentals and Theory of HVAC/R Systems
165. IHACI: (CAQI/QM/QS) Electrical Module Part 1 - Practical Fundamentals and Theory of HVAC/R Systems (WEBCAST)
166. IHACI: (CAQI/QM/QS) Electrical Module Part 2 - Essential HVAC/R System Motor Theory for the Field Technician
167. IHACI: (CAQI/QM/QS) Electrical Module Part 2 - Essential HVAC/R System Motor Theory for the Field Technician (WEBCAST)
168. IHACI: (CAQI/QM/QS) Electrical Module Part 3 - Different Electrical Components Found in the HVAC/R Industry
169. IHACI: (CAQI/QM/QS) Electrical Module Part 3 - Different Electrical Components Found in the HVAC/R Industry (WEBCAST)
170. IHACI: (CAQI/QM/QS) Electrical Module Part 4 - Electrical Schematics: A Roadmap to Diagnosing a HVAC/R System
171. IHACI: (CAQI/QM/QS) Electrical Module Part 4 - Electrical Schematics: A Roadmap to Diagnosing a HVAC/R System (WEBCAST)
172. IHACI: (CAQI/QM/QS) Gas Heating Module Part 1 - Practical Fundamentals and Theory of Gas Heating
173. IHACI: (CAQI/QM/QS) Gas Heating Module Part 1- Practical Fundamentals and Theory of Gas Heating
174. IHACI: (CAQI/QM/QS) Gas Heating Module Part 1- Practical Fundamentals and Theory of Gas Heating (WEBCAST)
175. IHACI: (CAQI/QM/QS) Gas Heating Module Part 2 - Quality Installation, Maintenance and Service of Gas Heating Systems
176. IHACI: (CAQI/QM/QS) Gas Heating Module Part 2- Quality Installation, Maintenance, and Service of Gas Heating Systems
177. IHACI: (CAQI/QM/QS) Gas Heating Module Part 2- Quality Installation, Maintenance, and Service of Gas Heating Systems (WEBCAST)
178. IHACI: (CAQI/QM/QS) HVAC System Diagnostics Part 1 - Practical Fundamentals, Theory, Methodology and Mind-set of True System Diagnostics (WEBCAST)
179. IHACI: (CAQI/QM/QS) HVAC System Diagnostics Part 2 - Essential Field Techniques Required to Investigate the HVAC/R System (WEBCAST)
180. IHACI: (CAQI/QM/QS) HVAC System Diagnostics Part 3 - Evaluating, Analyzing and Ultimately Identifying the Root Causes(s) of the HVAC/R System(WEBCAST)
181. IHACI: (CAQI/QM/QS) HVAC System Diagnostics Part 4 - Accurate Elimination and Verification of the Root Causes(s) of the HVAC/R System (WEBCAST)

182. IHACI: (CAQI/QM/QS) System Performance Module Part 1 - Thermodynamics: Heat In Motion (WEBCAST)
183. IHACI: (CAQI/QM/QS) System Performance Module Part 1 - Thermodynamics: Heat In Motion (WEBCAST)
184. IHACI: (CAQI/QM/QS) System Performance Module Part 2 - A Sub-System of the Building (WEBCAST)
185. IHACI: (CAQI/QM/QS) System Performance Module Part 2 - A Sub-System of the Building (WEBCAST)
186. IHACI: (CAQI/QM/QS) System Performance Module Part 3 - Heating System: Comfort with Energy Efficiency (WEBCAST)
187. IHACI: (CAQI/QM/QS) System Performance Module Part 3 - Heating System: Comfort with Energy Efficiency (WEBCAST)
188. IHACI: (CAQI/QM/QS) System Performance Module Part 4 - Cooling System: Comfort with Energy Efficiency (WEBCAST)
189. IHACI: (CAQI/QM/QS) System Performance Module Part 4 - Cooling System: Comfort with Energy Efficiency (WEBCAST)
190. IHACI: 2020 NATE HVAC/R Support Module Part 1
191. IHACI: 2020 NATE HVAC/R Support Module Part 2
192. IHACI: 2020 NATE HVAC/R Support Module Part 3
193. IHACI: 2020 NATE HVAC/R Support Module Part 4
194. IHACI: AC/HP Refrigeration Module Part 1 - Practical Fundamentals and Theory of the Refrigeration Circuit (WEBCAST)
195. IHACI: AC/HP Refrigeration Module Part 2 - CAQI of Air Conditioning and Heat Pump Systems (WEBCAST)
196. IHACI: AC/HP Refrigeration Module Part 3 - CAQM of Air Conditioning and Heat Pump Systems (WEBCAST)
197. IHACI: AC/HP Refrigeration Module Part 4 - CAQS of Air Conditioning and Heat Pump Systems (WEBCAST)
198. IHACI: Boiler Module Part 1 - Fundamental Theory & Basic Operation of Commercial Boiler Systems (WEBCAST)
199. IHACI: Boiler Module Part 2 - Installation, Operation and Service Practices of Commercial Boiler Systems (WEBCAST)
200. IHACI: CA 2019 Title 24 Module Part 1
201. IHACI: CA 2019 Title 24 Module Part 1 (WEBCAST)
202. IHACI: CA 2019 Title 24 Module Part 2
203. IHACI: CA 2019 Title 24 Module Part 2 (WEBCAST)
204. IHACI: Chiller Module Part 1 - Fundamental Theory & Basic Operation of Commercial Chillers (WEBCAST)
205. IHACI: Chiller Module Part 2 - Installation, Operation and Service Practices of Commercial Chillers (WEBCAST)
206. IHACI: Commercial Refrigeration Module Part 1 - Fundamental Theory and Basic Operation of Commercial Refrigeration Systems (WEBCAST)
207. IHACI: Commercial Refrigeration Module Part 2 - Installation, Operation and Service Practices of Commercial Refrigeration Systems (WEBCAST)
208. IHACI: Cooling Tower Module Part 1 - Fundamental Theory & Basic Operation of Commercial Cooling Towers (WEBCAST)
209. IHACI: Cooling Tower Module Part 1 – Fundamental Theory & Basic Operation of Commercial Cooling Towers (WEBCAST)
210. IHACI: Cooling Tower Module Part 2 - Installation, Operation and Service Practices of Commercial Cooling Towers (WEBCAST)
211. IHACI: Cooling Tower Module Part 2 – Installation, Operation and Service Practices of

Commercial Cooling Towers (WEBCAST)
212. IHACI: HVAC/R New Hire Module Part 1 (WEBCAST)
213. IHACI: HVAC/R New Hire Module Part 2 (WEBCAST)
214. IHACI: HVAC/R New Hire Module Part 3 (WEBCAST)
215. IHACI: HVAC/R New Hire Module Part 4 (WEBCAST)
216. IHACI: NATE Certification Training Series Part 1 Core General and Electrical Skills (WEBCAST)
217. IHACI: NATE Certification Training Series Part 2 Gas Heating Introduction, Installation, and Service (WEBCAST)
218. IHACI: NATE Certification Training Series Part 3 AC & Heat Pump Introduction, Installation, and Service (WEBCAST)
219. IHACI: NATE Certification Training Series Part 4 Air Distribution Introduction, Installation, and Service (WEBCAST)
220. IHACI: NATE HVAC/R Support Training Module Part 1 (WEBCAST)
221. IHACI: NATE HVAC/R Support Training Module Part 2 (WEBCAST)
222. IHACI: NATE HVAC/R Support Training Module Part 3 (WEBCAST)
223. IHACI: NATE HVAC/R Support Training Module Part 4 (WEBCAST)
224. Induction Woks - Types, Uses, Performance and Efficiency
225. Industrial Lighting Workshop – WEBINAR
226. Integrated Design Process: How to Establish Project Goals and Metrics, Assess Success and Stay on Track (WEBCAST)
227. Integrated Design Process: How to Use Whole-Building Performance Energy Targets During Design (WEBCAST)
228. Integrated Design Process: Projects of All Sizes and Delivery Methods (WEBCAST)
229. Intro to Residential HVAC Design in 3D (WEBCAST)
230. Introduction to CBECC-Res Energy Modeling Software for Residential Buildings
231. Introduction to Programmable Logic Controllers: Energy Efficiency Applications
232. Introduction to Programmable Logic Controllers: Energy Efficiency Applications - (REVISED This In-Class Event is Now an ON-LINE WEBINAR Class)
233. Introduction to Programmable Logic Controllers: Energy Efficiency Applications (WEBCAST)
234. Introduction to Programmable Logic Controllers: Energy Efficiency Applications (WEBINAR)
235. Introduction to Residential HVAC Design in 3D (WEBCAST)
236. Introduction to the Passive House Standard (WEBCAST)
237. Irrigation System Field Maintenance - Learning Units: Nitrogen Management Plan self certificaiton 2 Hours/ CCA CEUs 2 Hours
238. Irrigation System Performance (WEBINAR)
239. It'sAboutQ Online HVAC/R Training
240. Kicking Carbon Out of Buildings - Design for Decarbonized Buildings (WEBCAST)
241. LEED Project Management (WEBCAST)
242. Lighting Controls Overview and Manufacturers' Demo - (WEBCAST)
243. Lighting for Commercial Food Service (WEBINAR)
244. Lighting Fundamentals – Part 1: Terminology, Vision and Color (WEBCAST)
245. Low-Cost Hot Water System Retrofits for Commercial Food Service
246. Manitowoc Ice Machine Service Training (WEBCAST)
247. Multifamily Electrification: Introduction
248. Multifamily Electrification: Retrofit Applications and Electrical Assessments (WEBCAST)
249. Multifamily Electrification: Space Conditioning and Water Heating (WEBCAST)
250. Multifamily Electrification: Space Conditioning Deep Dive & Emerging Technologies

(WEBCAST)
251. Navigating Lighting Design Decisions
252. NCI: Airflow Testing & Diagnostics Live Online Day 1 (WEBCAST)
253. NCI: Airflow Testing & Diagnostics Live Online Day 1 of 2 (WEBCAST)
254. NCI: Airflow Testing & Diagnostics Live Online Day 2 (WEBCAST)
255. NCI: Airflow Testing & Diagnostics Live Online Day 2 of 2 (WEBCAST)
256. NCI: Airflow Testing & Diagnostics Technical Training - Discover Hidden Causes to Common Customer Complaints
257. NCI: Airflow Testing & Diagnostics Technical Training – Discover Hidden Causes to Common Customer Complaints
258. NCI: Carbon Monoxide & Combustion Recertification Live Online Day 1 of 2 (WEBCAST)
259. NCI: Carbon Monoxide & Combustion Recertification Live Online Day 2 of 2 (WEBCAST)
260. NCI: Combustion and Carbon Monoxide Recertification Live Online - Day 1 (WEBCAST)
261. NCI: Combustion and Carbon Monoxide Recertification Live Online - Day 2 (WEBCAST)
262. NCI: Combustion Performance and Carbon Monoxide Safety Certification Program Part 1 - CO Safety Testing & Diagnostics
263. NCI: Combustion Performance and Carbon Monoxide Safety Certification Program Part 2 - Combustion Performance & Diagnostics
264. NCI: Combustion Performance and Carbon Monoxide Safety Certification Program Part 3 - CO/Combustion Review & Certification Exam
265. NCI: Commercial Air Balancing Certification Program Part 1 - The Key Elements of Air Balancing
266. NCI: Commercial Air Balancing Certification Program Part 2 - Balancing Principles Techniques and Reporting
267. NCI: Commercial Air Balancing Certification Program Part 3 - Economizers and Kitchen Exhaust Systems: Certification Exam
268. NCI: Commercial Air-side Recertification Live Online - Day 1 (WEBINAR)
269. NCI: Commercial Air-side Recertification Live Online - Day 2 (WEBINAR)
270. NCI: Commercial Air-Side Recertification Live Online Day 1 (WEBCAST)
271. NCI: Commercial Air-Side Recertification Live Online Day 2 (WEBCAST)
272. NCI: Commercial System Performance Certification Program Part 1 - The Key Elements of HVAC System Performance
273. NCI: Commercial System Performance Certification Program Part 2 - Measure, Diagnose and Improve Poor Performance: Certification Exam
274. NCI: Commercial System Performance Live Online Certification Program – Day 1 of 4 Day Series (WEBCAST)
275. NCI: Commercial System Performance Live Online Certification Program – Day 2 of 4 Day Series (WEBCAST)
276. NCI: Commercial System Performance Live Online Certification Program – Day 3 of 4 Day Series (WEBCAST)
277. NCI: Commercial System Performance Live Online Certification Program – Day 4 of 4 Day Series (WEBCAST)
278. NCI: Duct System Optimization Certification Program Part 1 - Introduction to Air Distribution Upgrade
279. NCI: Duct System Optimization Certification Program Part 2 - Optimize the Duct System: Certification Exam
280. NCI: Duct System Optimization Live Online Certification Program – Day 1 of 4 Day

Series (WEBCAST)
281. NCI: Duct System Optimization Live Online Certification Program – Day 2 of 4 Day Series (WEBCAST)
282. NCI: Duct System Optimization Live Online Certification Program – Day 3 of 4 Day Series (WEBCAST)
283. NCI: Duct System Optimization Live Online Certification Program – Day 4 of 4 Day Series (WEBCAST)
284. NCI: Explore HVAC Field Performance Live Online (WEBCAST)
285. NCI: Explore HVAC Field Performance Live Online (WEBCAST)
286. NCI: Grow Profitably with Airflow Upgrades Live Online (WEBCAST)
287. NCI: Improve Economizer Performance & Meet Today's Ventilation Standards – Live Online Certification Program Day 1 of 4 (WEBCAST)
288. NCI: Improve Economizer Performance & Meet Today's Ventilation Standards – Live Online Certification Program Day 2 of 4 (WEBCAST)
289. NCI: Improve Economizer Performance & Meet Today's Ventilation Standards – Live Online Certification Program Day 3 of 4 (WEBCAST)
290. NCI: Improve Economizer Performance & Meet Today's Ventilation Standards – Live Online Certification Program Day 4 of 4 (WEBCAST)
291. NCI: Optimize Economizer Performance Certification Training
292. NCI: Performance-Based Selling Live Online - Day 1 (WEBINAR)
293. NCI: Performance-Based Selling Live Online - Day 1 of 4 Day Series (WEBCAST)
294. NCI: Performance-Based Selling Live Online - Day 2 (WEBINAR)
295. NCI: Performance-Based Selling Live Online - Day 2 of 4 Day Series (WEBCAST)
296. NCI: Performance-Based Selling Live Online - Day 3 (WEBINAR)
297. NCI: Performance-Based Selling Live Online - Day 3 of 4 Day Series (WEBCAST)
298. NCI: Performance-Based Selling Live Online - Day 4 (WEBINAR)
299. NCI: Performance-Based Selling Live Online - Day 4 of 4 Day Series (WEBCAST)
300. NCI: Refrigerant-Side Performance Certification Program Part 1 – Equipment Performance of the Air & Refrigerant-Side
301. NCI: Refrigerant-Side Performance Certification Program Part 1 - Equipment Performance, the Airside and the Refrigerant-Side
302. NCI: Refrigerant-Side Performance Certification Program Part 2 - Refrigerant-Side Basics, Diagnostics, and Opportunities: Certification Exam
303. NCI: Refrigerant-Side Performance Certification Program Part 2 – Refrigerant-Side Basics, Diagnostics, and Opportunities: Certification Exam
304. NCI: Refrigerant-Side Performance Live Online Certification Program Day 1 of 4 (WEBCAST)
305. NCI: Refrigerant-Side Performance Live Online Certification Program Day 2 of 4 (WEBCAST)
306. NCI: Refrigerant-Side Performance Live Online Certification Program Day 3 of 4 (WEBCAST)
307. NCI: Refrigerant-Side Performance Live Online Certification Program Day 4 of 4 (WEBCAST)
308. NCI: Residential Air Balancing Certification Program - Testing & Balancing Residential Systems: Certification Exam
309. NCI: Residential Air Balancing Live Online Certification Program Day 1 of 2 (WEBCAST)
310. NCI: Residential Air Balancing Live Online Certification Program Day 2 of 2 (WEBCAST)
311. NCI: Residential Air-side Recertification Live Online - Day 1 (WEBINAR)
312. NCI: Residential Air-side Recertification Live Online - Day 2 (WEBINAR)

313. NCI: Residential Air-Side Recertification Live Online Day 1 (WEBCAST)
314. NCI: Residential Air-Side Recertification Live Online Day 2 (WEBCAST)
315. NCI: Residential HVAC System Performance Certification Program Part 1 of 4 (In-Person/Contractor)
316. NCI: Residential HVAC System Performance Certification Program Part 2 of 4 (In-Person/Contractor)
317. NCI: Residential HVAC System Performance Certification Program Part 3 of 4 (In-Person/Contractor)
318. NCI: Residential HVAC System Performance Certification Program Part 4 of 4 (In-Person/Contractor)
319. NCI: Residential System Performance Live Online Certification Program – Day 1 of 4 Day Series (WEBCAST)
320. NCI: Residential System Performance Live Online Certification Program – Day 2 of 4 Day Series (WEBCAST)
321. NCI: Residential System Performance Live Online Certification Program – Day 3 of 4 Day Series (WEBCAST)
322. NCI: Residential System Performance Live Online Certification Program – Day 4 of 4 Day Series (WEBCAST)
323. Net Energy Metering (NEM) Interconnection Updates Workshop
324. Optimizing Kitchen Ventilation and Restaurant HVAC for Maximum Health and Safety and Minimum Cost-to-Operate
325. Optimizing Kitchen Ventilation and Restaurant HVAC for Maximum Health and Safety and Minimum Cost-to-Operate (WEBCAST)
326. Optimizing Residential Forced-Air HVAC Systems (WEBCAST)
327. Optimizing Residential Forced-Air HVAC Systems: Airflow for Comfort and Efficiency (WEBCAST)
328. Optimizing Residential Forced-Air HVAC Systems: Low-Loss Duct Systems (WEBCAST)
329. Outdoor Lighting with LEDs
330. Outdoor Lighting Workshop – (WEBCAST)
331. Overcoming Installation Challenges for Heat Pump Water Heater Retrofits
332. Overcoming Installation Challenges for Heat Pumps in HVAC Retrofits - Learning Units: BPI .75 Units/ BIG 1.5 Units
333. Packaging Your Lighting Recommendations
334. Pathways to a Zero Net Energy Home
335. Phenomenal LED -WEBINAR
336. Photovoltaic (PV) Site & Energy Storage Systems (ESS) Analysis and System Sizing Day 1 - Learning Units: NABCEP 2
337. Photovoltaic (PV) Site & Energy Storage Systems (ESS) Analysis and System Sizing Day 2 - NABCEP 2 Learning Units
338. Photovoltaic (PV) Site Analysis and System Sizing (WEBCAST)
339. PLC LEVEL 1: Industrial Electricity and Automated Controls (DAY 2 OF 2)
340. PLC LEVEL 1: Industrial Electricity and Automated Controls (2-Day Workshop)
341. PLC LEVEL 2: Industrial Electricity and Automated Controls (2-Day Workshop)
342. PLC LEVEL 2: Industrial Electricity and Automated Controls (DAY 2 OF 2)
343. PLC LEVEL 3: Industrial Electricity and Automated Controls (2-Day Workshop)
344. PLC LEVEL 3: Industrial Electricity and Automated Controls (DAY 2 OF 2)
345. PLC LEVEL 4: Industrial Electricity and Automated Controls (2-Day Workshop)
346. PLC LEVEL 4: Industrial Electricity and Automated Controls (DAY 2 OF 2)
347. Power Quality Fundamentals
348. Preparation for Lighting Controls Success - Using a BOD (Basis of Design) and a

SOO (Sequence of Operations) (WEBINAR)
349. Project Management for Energy Efficiency (WEBINAR)
350. Pump and Well Efficiency for Municipal Potable Water Systems
351. Pump and Well Efficiency for Potable Water Systems
352. Pump Efficiency Testing & Determining OPE
353. Pump Testing & Improving Your Pumping Plant Efficiency 2.0 Contact Hours State Water Res Control Board (Drinking Water Div: Water Distr Operators)
354. Pumps, Energy and Water Efficiency (WEBINAR)
355. PV + Batteries: Integrating Storage with Grid-Tied Photovoltaic Systems (WEBINAR)
356. PV + Batteries: Integrating Storage with Grid-Tied Photovoltaic Systems (Part 2 of 2) - Learning Units 3.25 BIG/ 3 NABCEP
357. PV + Batteries: Integrating Storage with Grid-Tied Photovoltaic Systems (WEBCAST)
358. PV + Batteries: Integrating Storage with Grid-Tied Photovoltaic Systems Part 1 of 2 - Learning Units 3.25 BIG/ 3 NABCEP
359. Radiant Cooling and Heating Systems for Large Commercial Buildings (WEBCAST)
360. Remote Monitoring of Pump and Well – Part 2
361. Remote Monitoring of the Pump and Well Part 1
362. Remote Well and Pump Monitoring using the Smart Meter
363. Residential and Light Commercial HVAC
364. Residential Heating and Air Conditioning for All-Electric, Climate Smart Homes (WEBCAST)
365. Residential Lighting Controls
366. Restaurant Rebound - Operating an Energy Efficient Kitchen
367. Retrofitting Homes for Electrification and Decarbonization
368. SCE 2020 Annual Water Conference (Online Only Event) (WEBCAST)
369. Scotsman Ice Machine Service Training
370. Selecting Retrofit or Replacement Lighting (WEBCAST)
371. Self-Generation Incentive Program (SGIP) Workshop (Skype Only)
372. Selling High Performance Homes (Webinar – MS Teams)
373. Solar + Batteries for Homeowners (WEBCAST)
374. Solar PV: Technology and Valuation (Webinar – MS Teams)
375. Specifying Efficient Equipment for Production Kitchens
376. The Benefits and Challenges of R290 as a Refrigerant
377. The Ventless Kitchen
378. Title 24 Part 6 Essentials Non-Residential Standards - Plans Examiners & Building Inspectors
379. Title 24 Part 6 Essentials: Residential Standards - Plans Examiners & Building Inspectors
380. Title 24: Where We're Headed with the 2019 Standards
381. Title 24: Where We're Headed with the 2019 Standards - WEBINAR Only
382. Title 24: Where We're Headed with the 2019 Standards (WEBCAST)
383. Ultraviolet-C (UVC) and Other Strategies for Pathogen Mitigation in Buildings (WEBCAST)
384. Understanding a Pump Efficiency Test
385. Understanding the New Building Challenge (WEBINAR)
386. Value and Benefits of Heat Pump Water Heaters and SCE Programs (WEBCAST)
387. Variable Frequency Drives (VFDs) for Pumping Applications
388. Variable Frequency Drives for Agricultural Pumping (WEBINAR)
389. Variable Refrigerant Flow and Ductless Systems - Design and Application
390. Variable Speed Drives for Agricultural Applications - Learning Units: NMP Self-Certification 2 Hours/ CCA CEUs 2 Hours

391. VRF/VRV Install & Service Training (WEBCAST)
392. Well Rehabilitations: Why a One Size Fits All Approach Will Not Produce Effective Results
393. Where Are We With Integrating Lighting and Whole Building Controls?
394. Window Installation Procedures to Provide Real World Performance and Prevent Water Intrusion
395. Window Selection for New and Existing Homes
396. Window Selection for New and Existing Homes (WEBCAST)
397. Zero Net Energy Design Residential
398. Zero Net Energy Design Residential (WEBCAST)