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June 15, 2020

Advice No. 5646

(Southern California Gas Company – U 904 G)

Advice No. 4258-G/5849-E

(Pacific Gas & Electric Company – U 39 M)

Advice No. 4230-E

(Southern California Edison Company – U 338 E)

Advice No. 5-E/4-G

(Tri-County Regional Energy Network)

Public Utilities Commission of the State of California

**Subject: 2021 Joint Cooperation Memorandum (JCM) of 3C-REN, SoCalGas, SCE,
and PG&E Pursuant to Decision (D.) 18-05-041**

Purpose

Southern California Gas Company (SoCalGas), on behalf of Tri-County Regional Energy Network (3C-REN), Southern California Edison Company (SCE), and Pacific Gas & Electric Company (PG&E) hereby submits to the California Public Utilities Commission (Commission) the 2021 JCM, as shown in Attachment A, pursuant to Ordering Paragraph (OP) 38 of 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 plan

to avoid or minimize duplication of programs that address a common sector in overlapping service territories, specifically noting that the IOU PAs and Non-IOU PAs shall:

- (1) Summarize all the programs they intend to run and indicate which programs may overlap;
- (2) Describe how each will work with the other so that customers are informed of all options and not steered simply to their own programs; and
- (3) Describe how each will ensure customers are also aware of the others' programs, where that administrator does not have a similar offering.

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 no later than August 1, 2018. SoCalGas submitted the 2019 JCM on August 1, 2018 and was approved on August 30, 2018. OP 38 of D.18-05-041 further directed that the IOU and Non-IOU PAs must submit subsequent annual JCMs via Tier 2 Advice Letters no later than June 15, prior to submitting their Annual Budget Advice Letters.

2021 Joint Cooperation Memo

Attachment A of this Advice Letter submittal contains the 2021 JCM between 3C-REN, SoCalGas, SCE, and PG&E (collectively the "Joint PAs"). The JCM provides (1) a summary of all the programs 3C-REN intends to run and indicates which programs may overlap with SoCalGas, SCE and PG&E programs; (2) provides a summary of the coordination efforts between the Joint PAs; (3) provides a summary of the IOU PAs 2021 comparable program offerings, if applicable (Appendix A); and (4) provides details regarding 3C-REN's program compliance with D.12-11-015.

The Joint PAs make note that the budgets and programs outlined in this memo are the best estimates of 2021 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 Annual Budget Advice Letter.

Protests

Anyone may protest this Advice Letter 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 Advice Letter, which is July 5, 2020. 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 Advice Letter via U.S. mail or fax. Please submit protests or comments to this Advice Letter 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

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: PGETarrifs@pge.com

For SCE:

Gary A. Stern, Ph.D.
Managing Director – Statewide Regulatory Operations
Southern California Edison Company
8631 Rush Street
Rosemead, CA 91770
Telephone: (626) 302-9645
Facsimile: (626) 302-6396
E-mail: AdviceTariffManager@sce.com

And

Laura Genao
Managing Director, State Regulatory Affairs
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

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, 2020, which is 30 calendar days from the date submitted.

Notice

A copy of this Advice Letter 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, et al. 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/ Ronald van der Leeden
Ronald van der Leeden¹
Director – Regulatory Affairs

Attachments

¹ SCE, PG&E, and 3C-REN have authorized SoCalGas to sign and submit this Advice Letter on their behalf.



ADVICE LETTER SUMMARY

ENERGY UTILITY



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

Company name/CPUC Utility No.:

Utility type:

ELC GAS WATER
 PLC HEAT

Contact Person:

Phone #:
E-mail:
E-mail Disposition Notice to:

EXPLANATION OF UTILITY TYPE

ELC = Electric GAS = Gas WATER = Water
PLC = Pipeline HEAT = Heat

(Date Submitted / Received Stamp by CPUC)

Advice Letter (AL) #:

Tier Designation:

Subject of AL:

Keywords (choose from CPUC listing):

AL Type: Monthly Quarterly Annual One-Time Other:

If AL submitted in compliance with a Commission order, indicate relevant Decision/Resolution #:

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

Summarize differences between the AL and the prior withdrawn or rejected AL:

Confidential treatment requested? Yes No

If yes, specification of confidential information:

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:

No. of tariff sheets:

Estimated system annual revenue effect (%):

Estimated system average rate effect (%):

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:

Service affected and changes proposed¹:

Pending advice letters that revise the same tariff sheets:

¹Discuss in AL if more space is needed.

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:
Title:
Utility Name:
Address:
City: State:
Telephone (xxx) xxx-xxxx:
Facsimile (xxx) xxx-xxxx:
Email:

Name:
Title:
Utility Name:
Address:
City: State:
Telephone (xxx) xxx-xxxx:
Facsimile (xxx) xxx-xxxx:
Email:

ATTACHMENT A

**3C-REN, SoCalGas, SCE, AND PG&E
2021 JOINT COOPERATION MEMORANDUM**

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I. 3C-REN PORTFOLIO SUMMARY OF PROGRAMS OFFERED FOR 2021

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	\$1,231,167	N/A
3C-REN C&S (3C-CC-001)	C&S	\$1,750,295	N/A
3C-REN RES DI (3C-R-001)	Residential	\$3,594,291	LED lighting, 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 2021 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 utilities³ (IOU) offerings for the 3C-REN territory, as the region is far from IOU training & resource hubs. The 3C-REN WE&T 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, including hard-to-reach (HTR) workers and those in identified disadvantaged communities (DACs).

¹ Actual budget information will be provided in 3C-REN's Energy Efficiency Annual Budget Advice Letter submittal on September 1, 2020.
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.

Building professionals living and working in the 3C-REN territory face unique 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, install, and maintain new technologies essential for high performance;
- Grow customer demand for energy efficiency 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 provided locally and designed to meet the unique needs of the tri-county region.

The 3C-REN applies a holistic approach to the market with highly targeted training events, using apprenticeship and mentorship 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 \$1,231,167.

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 education, 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 compliance standards. 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
Estimated 2021 Budget⁷	\$1,231,167	\$8,600,052	\$4,700,000	\$2,808,149

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.

⁷ Actual budget information will be provided in REN's 2020 PA's 2020 REN's 2021 Energy Efficiency Annual Budget Advice Letter submittal on September 1, 2020.

<p>Target Audience</p>	<p>Local 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.</p>	<p>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.</p>	<p>Workforce needing technical residential, multi-family, and/or small business trainings at Energy Centers or online via simulcast or webinar.</p>	<p>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.</p>
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Pacific Gas & Electric Company

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 2019 and 2020 scheduled to date as an illustration of our potential 2021 offerings in the three areas that appear of greatest interest to the 3C-REN—residential; multi-family, and small/medium business. Appendix B also includes a full list of the in-person, simulcast, webinar classes and on-demand classes in the same period.

Some of the classes listed in Appendix B are restricted to PG&E's physical Energy Centers in Stockton, San Ramon for food service, or San Francisco, 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, assuming that the instructor is willing and able to travel. PG&E's WE&T program also has an online 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. The TLL addresses an up-front cost barrier faced by many small businesses and energy consultants. Tools are available for loan from our Stockton and San Francisco energy centers. PG&E can ship the tool 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. PG&E will coordinate with organizations that offer soft skills training as part of the Statewide Career and Workforce Readiness (CWR) program scheduled to launch in 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 2020 as an example of potential offerings for 2021.

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.

SCE has applied for the IEET program to be funded through the Income Qualified Application for 2021 and beyond. However, the coordination between PA's will continue regardless of funding source.⁸

Southern California Gas Company

SCG3729 - WE&T Integrated Energy Education Training (IEET)

The SoCalGas WE&T Integrated Energy Education Training (IEET) subprogram (formerly Centergies) will offer 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 2020, many of which will be part of our 2021 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, C&S programs, including Public Sector/Local Government Partnership⁹ programs, is to ensure

⁸ A.19-11-003 - _SCE ESA and CARE Application Testimony-SCE-04.

⁹ Local Government Partnership Programs for 2020 in 3C-REN; Ventura County Regional Energy Alliance, San Luis Obispo County Energy Watch, North Santa Barbara Energy Watch Partnership and with South County Energy Efficiency Partnership in Santa Barbara.

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, 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 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 online class schedule

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 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)

With the change to PG&E as the statewide administrator for the Career and Workforce Readiness (CWR) and Career Connections WE&T subprograms, the 3C-REN will leverage the coordination protocol described above to include any statewide considerations. The 3C-REN program does not include a traditional K-12 student component, so coordination on the Connections sub-program is likely not needed. PG&E will engage the 3C-REN after a vendor is secured for the CWR subprogram (likely mid-2021) to discuss a coordination strategy.

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 green building standards training and support for plan review and field compliance. All design-side 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 concerns. 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 \$1,750,295.

The target audience is all public and private sector building professionals including construction 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 subprogram¹⁰ (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

¹⁰ Note: The Compliance Improvement subprogram is a statewide program offered by all IOUs.

Estimated 2021 Budget¹¹	\$1,750,295	\$4,773,560.00	\$1,600,000	\$286,056
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:

¹¹ Actual budget information will be provided in the Program Administrator's 2021 Energy Efficiency Annual Budget Advice Letter submittal in September 2020.

- Class name(s)
- 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 DI 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), 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 receive an in-home visit from a trained assessor who collects information on the home, provides consumer education, and installs DI measures. 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. The program employs digital education tools such as energy education videos that customers can watch while DI measures are being installed to reduce time spent in the home. 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. Additionally, 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 \$3,594,291.

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 lighting, air sealing, insulation, HVAC, water flow controls, smart thermostat, power strip, duct system servicing, appliances, HVAC servicing, and water heating measures.¹² Single measures will be allowed and savings will be deemed per measure.

1. Comparable SoCalGas and SCE Programs

Table 4: RES DI Program Comparison

DI	3C-REN	SCE	SCE	SoCalGas
Resource Program Name	3C-R-001 RES DI- Home Energy Savings Program	SCE-13-SW-001G – RES DI (formerly Energy Upgrade California – MIDI)	SCE-13-SW-001C – Multifamily EE Rebate Program	SCG3820 – RES-Direct Install Program

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	SoCalGas
Eligible Measures	LED lighting, 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. ¹³	HVAC Measures (Efficient Fan Control, Brushless Fan Motor, Air Flow Adjustment, Condenser Coil Cleaning, Refrigerant Charge Adjustment, Duct Test and Seal, Window Evaporative Cooler), Variable Speed Pool Pump Residential Smart (Communicating) Thermostat.	The program offers deemed incentives for energy- saving products for both common and dwelling areas of multifamily properties; end uses include: HVAC and Lighting.	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).
Estimated 2021 Budget¹⁴	\$3,594,291	\$10,000,000	\$4,900,000	\$7,000,000

¹³ Please note that this is a preliminary list of measure types, and that the final measures will be provided in the program Implementation Plan.

¹⁴ Actual budget information will be provided in the Program Administrator’s 2021 Energy Efficiency Annual Budget Advice Letter submittal on September 1, 2020.

DI	3C-REN	SCE	SCE	SoCalGas
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.	Residential single-family home customers within SCE's service territory.	Property owners and managers of existing multifamily properties. The program targets all levels of multifamily buildings (i.e., low-income, affordable-to-moderate income, market-rate), including those located in DACs.	Mainstream, market rate homeowners.

Southern California Edison

SCE RES DI (formerly Energy Upgrade California – Middle Income Direct Install [MIDI]) – [SCE-13-SW-001G]

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 is in active solicitation for residential program offerings. Programs will be finalized by September 30, 2020 to begin implementation in 2021. While SCE

does not yet know the composition of these programs, SCE will continue to work with 3C-REN to coordinate activities as outlined below.

SCE Multifamily Energy Efficiency Program – [SCE-13-SW-001C]

The SCE Multifamily Energy Efficiency Rebate (MFEER) Program is a continuation of the existing statewide program within the residential EE portfolios. The MFEER Program offers a variety of incentives for energy-saving products to motivate the multifamily property owners and managers to install energy-efficient equipment in both common and dwelling areas of multifamily properties. The program can facilitate onsite assessments and encourage property owners to take advantage of rebates for more extensive improvements over time. The program targets all levels of multifamily buildings (i.e., low-income, affordable-to-moderate income, market-rate), including those located in DACs.

Additionally, the program addresses the ongoing concern with “split incentives,” where the residents are not the owners of the property, so they lack the incentive to improve their energy usage. Similarly, the property owners do not live on-site and thus do not pay higher utility expenses due to inefficient appliances, and therefore lack any incentive to upgrade to energy-efficient equipment.

SCE is in active solicitation for residential program offerings. Programs will be contracted by September 30, 2020 to begin implementation in 2021. While SCE does not yet know the composition of these programs, SCE will continue to work with 3C-REN to coordinate activities.

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.

SoCalGas Account Executives (AE) or contractors work as a single point of contact and assist the customer through the application process of the various multifamily program offerings. Supporting Multifamily Energy consulting firms provide customer consultation, project review, pre and post project assessment/inspection and submission of required documentation/reports.

The MF Whole Building Program provides calculated rebates based on whole property/building simulated energy reduction. Measure installation may be implemented by any qualified 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.

SCG 3763 RES-MF Direct Therm Savings

The Multi-Family Direct Therm Savings Program (marketed as “Energy Smart”) targets owners and managers of multi-unit residential properties. The program encourages participation by providing energy efficient products and installation at no cost to the end use customer. Marketing activities focus primarily on apartment building owners and managers.

SoCalGas is in active solicitation and negotiations for residential program offerings. The Single Family and Multifamily Programs will be finalized and launch by the 3rd Quarter of 2020. The Comprehensive Manufactured Home segment is expected to be negotiated and launched by the 4th Quarter of 2020. While SoCalGas is in the process of negotiating the composition of these programs, SCE will continue to work with 3C-REN to coordinate activities as outlined below.

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 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 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.”¹⁵

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.

¹⁵ D.18-05-41, Finding of Fact 63

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-reach customers.”¹⁶ 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. As noted in the Business Plan, “reported IOU residential savings in the Tri-Counties is not substantial” and “could be due the hard to reach elements on the geographic area and lack of ability to effectively reach customers consistently.”

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.

¹⁶ D.18-05-41, Conclusion of Law 54.

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

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.
<p>3C-REN WE&T 3C-WET-001</p>	<p>PG&E Integrated Energy Education & Training (IEET)</p> <p>SCE WE&T IEET (SCE-13-SW-010A)</p> <p>SoCalGas WE&T Integrated Energy Efficiency Training (SCG3729).</p>	<p>Strategy 3. Establish local, targeted training for building professionals.</p> <ul style="list-style-type: none"> • 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. 		
<p>3C-REN C&S 3C-CS-001</p>	<p>Statewide C&S Compliance Improvement Subprogram</p>	<p>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.</p>		

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.
<p>3C-REN Residential DI 3C-R-001</p>	<p>SoCalGas RES DI (SCG 3802)</p> <p>SCE RES DI (Formerly Energy Upgrade California – MIDI) (SCE-13- SW- 001G)</p>			<p>Strategy 1. Build trust and interest in deeper energy savings over time.</p> <ul style="list-style-type: none"> • Offer Direct Install program targeting hard-to-reach customers • Develop simple upgrade packages to streamline and offer easy installation and adoption of deeper retrofits <p>Strategy 2. Employ neighborhood approaches to achieve scale in reach and savings.</p> <ul style="list-style-type: none"> • Integrate workforce development into neighborhood programs to build skills and community buy- in

APPENDIX A - IOU(s) PORTFOLIO SUMMARY OF PROGRAMS OFFERED FOR 2021

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 ¹⁷	Eligible Measures
PG&E Integrated Energy Education & Training (formerly Centergies) [PGE21071]	Cross-cutting: WE&T	\$8,508,957	Not applicable. Non-resource program
PG&E Compliance Improvement Program [PGE21053]	Cross Cutting: C&S	\$4,773,560.00	Not applicable. Non-resource program

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	\$4,700,000	Not applicable. Non-resource program
SCE C&S – Compliance Improvement [SCE-13-SW-008C]	Cross Cutting: C&S	\$1,600,000	Not applicable. Non-resource program
SCE RES DI Program	Residential	\$10,000,000	HVAC Measures <ul style="list-style-type: none"> • Efficient Fan Control

¹⁷ Actual budget information will be provided in the Program Administrator's 2021 Energy Efficiency Annual Budget Advice Letter submittal on September 1, 2020.

¹⁸ Actual budget information will be provided in the Program Administrator's 2021 Energy Efficiency Annual Budget Advice Letter submittal on September 1, 2020.

[SCE-13-SW-001G]			<ul style="list-style-type: none"> • Brushless Fan Motor • Air Flow Adjustment • Condenser Coil Cleaning • Refrigerant Charge Adjustment • Duct Test and Seal • Window Evaporative Cooler • Variable Speed Pool Pump Residential Smart (Communicating) Thermostat
Multifamily EE Rebate Program [SCE-13-SW-001C]	Residential	\$4,900,000	<ul style="list-style-type: none"> • The program offers deemed incentives for energy- saving products for both common and dwelling areas of multifamily properties; end uses include: HVAC and Lighting.

Table 3. SoCalGas Summary of Comparable Programs

IOU Program Unique ID	Sector	Annual Budget	Eligible Measures
SCG3729 – WE&T- Integrated Energy Education Training (IET)	Cross Cutting	\$2,808,149	Not applicable.
SCG3726 – C&S- Compliance Enhancement	Cross Cutting	\$286,056	Not applicable.

¹⁹ Actual budget information will be provided in the Program Administrator’s 2021 Energy Efficiency Annual Budget Advice Letter submittal on September 1, 2020.

SCG3820 – RES-Direct Install Program	Residential	\$2,515,590	<ul style="list-style-type: none"> • 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
			<ul style="list-style-type: none"> • 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 - IOU Workforce, Education, and Training Class list

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

2019 and 2020-to-date

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. Gas Heating Module by IHACI
2. Demand Control Ventilation (DCV) and Variable Speed Fans
3. Ag./Industrial Refrigeration Systems Efficiency
4. Air Conditioning and Heat Pump Refrigeration Module by IHACI
5. Commercial Quality Maintenance and Installation of Economizers
6. Basics of Photovoltaic (PV) Systems for Grid-Tied Applications
7. IES Intermediate 10-Class Series: Quality Energy Efficient Lighting
8. Energy Auditing Techniques for Small & Medium Commercial Facilities
9. Solar Water Heating Systems: Residential and Commercial
10. Title 24 Proper Procedures for Charging Air Conditioners and Heat Pumps
11. How to Write the Owner's Project Requirements (OPR) and Basis of Design (BOD) for Lighting and Advanced Lighting Controls
12. How to Prepare a Control Intent Narrative (CIN) and Sequence of Operations (SOO) for Advanced Lighting Controls
13. Photovoltaic (PV) Site Analysis and System Sizing
14. Solar PV: Technology and Valuation
15. Basic Excel for Energy Auditors
16. Building Envelope and Duct Testing - MI-BEST Series
17. Air Flow Measures and Static Pressure - MI-BEST Series
18. Refrigerant Charge Verification - MI-BEST Series
19. Building Pressures and Ventilation Verification - MI-BEST Series
20. Graphic Representation of Data: Making Charts that Matter
21. Thermal By-Pass, Quality Insulation Installation, Advanced Building Envelope - MI-BEST Series
22. Electric Module by IHACI
23. ACCA Manual J - Equipment Sizing and Selection
24. ACCA Manual D - Duct Design
25. Calculating Photometric Lighting Solutions
26. Electric Module by IHACI: Session 3
27. Advanced ACCA Manual D
28. Electric Module by IHACI: Session 4
29. Energy Audit Skills: Tools, Data Collection Techniques, and Calculations
30. Residential Heat Pumps: Quality Design and Installation
31. BPI Combustion Safety and Depressurization
32. High Performance Crawl Spaces: A Practical Approach to Air Sealing and Insulating
33. Advanced Framing for Energy and Resource Efficiency
34. Best Practices for Lighting Audits - 2 Day Class
35. Energy Efficient Design and Retrofit of Laboratory Buildings
36. Demand Response: Basic Concepts, Programs, and Site Assessment

37. Energy Plus for Energy Modeling Practitioners - 2 day class
38. Heat Pumps: Residential Applications and Comparison with Solar Energy Systems
39. Air Sealing and Insulating Existing Homes
40. Commercial QI ACCA N,CS
41. Commercial QI ACCA Manual D, Q and T
42. Air Sealing to Achieve Zero Net Energy - New Techniques and Applications
43. California Advanced Lighting Controls Training Program (CALCTP) Systems Course
44. Commercial QI Advanced ACCA Manual N
45. HVAC/R New Hire Module by IHACI
46. Practical Guidance for Data Center Energy Efficiency - Part 1: HVAC Systems
47. Kicking Carbon Out of Buildings - Building Design for Decarbonized Buildings
48. 0-10V vs DALI Dimming - Choosing the Right Controls for Your Project
49. Microgrids: Basic Applications, Technologies, Value and Economics
50. Practical Guidance for Data Center Energy Efficiency - Part 2: IT and Electrical Considerations
51. How to Design and Build High Performance Walls and Roofs
52. Lighting Fundamentals
53. PG&E Rates and Tariffs: Essential Information for Energy Projects
54. Window Selection for New and Existing Homes
55. IES Intermediate Course: Quality Energy Efficient Lighting
56. Integrated Design Thinking for Zero Net Energy Residential Buildings
57. Balanced Ventilation for ZNE and High Performance Homes
58. Optimizing Residential HVAC System Performance
59. HVAC Fundamentals: New Ideas for Novices (2 Day Class)
60. Water Audit Basics for Small to Medium Size Businesses
61. Advanced Lighting Control Systems: Hands-On Workshop
62. NATE HVAC/R Support by IHACI
63. RCx101 Identifying and Assessing Common Retro-Cx Opportunities
64. Electric Heat Pumps for Domestic Space and Water Heating: Applications and Considerations
65. Energy Efficiency Update: Strategies for Reducing Energy Use, Operating Costs and Carbon Emissions at Commercial Facilities
66. PV + Batteries: Integrating Storage with Grid-Tied Photovoltaic Systems
67. Financing Fundamentals for Solar Energy Projects
68. The Benefits of Airtightness Testing for Multi-Family and Nonresidential Buildings: Lessons from Seattle
69. A Class for Control Freaks: Getting the Most from your Building Automation System
70. Evaluating and Selecting Luminaires
71. Integrated Enclosure and HVAC/Plumbing Design for High Performance Multi-Unit Residential Buildings (MURBS)
72. Commercial HVAC/R Introduction Module by IHACI

73. Continuous Exterior Insulation and Moisture Management - Buildings with Wood Structural Systems
74. Setting Priorities in Energy Upgrades to Existing Wood-Framed Residential and Small Nonresidential Buildings
75. Continuous Exterior Insulation and Moisture Management - Buildings with Steel and Concrete Structural Systems
76. High Performance Prefabricated Building
77. Comparing and Selecting a Lighting Controls System
78. Centrifugal Pumps: Principles and Opportunities for Hydronic Systems
79. Best Practices for Industrial Lighting
80. Commissioning with Data
81. Best Practices for Outdoor Lighting
82. A Tool Day Workshop
83. Case Studies of Documented Zero Net Energy Commercial Buildings in California
84. System Diagram Workshop
85. Radiant Cooling and Heating Systems for Large Commercial Buildings
86. Integrated Design: Mastering the Project Management Process (3Day Class)
87. Air Distribution Module by IHACI
88. Energy Auditing Techniques for Small & Medium Commercial Facilities (3 Day Class)
89. IES Fundamentals of Lighting
90. Air Sealing to Achieve Zero Net Energy- New Techniques and Applications
91. How to Write the Owner's Project Requirements (OPR) and a Basis of Design (BOD) for Lighting Controls
92. Best Practices for Lighting Retrofits
93. NATE Training Series by IHACI
94. PV plus Batteries: Integrating Storage with Grid-Tied Photovoltaic Systems
95. Optimizing Radiant Heating and Cooling Systems in Nonresidential Buildings
96. Case Studies in Advanced Lighting Controls - Learning from Exemplary Projects 2019 Update
97. High Performance Chilled Water Plant Design Workshop
98. DLC Advanced Lighting Control Systems Training
99. Inspecting Photovoltaic (PV) Systems for Code Compliance
100. Lighting Controls: Manufacturers' Seminars Round-Robin Part 1 - Hubbell NX, OSRAM Encelium, Signify SpaceWise
101. Energy Audit Report Writing Workshop: Conveying Value to Customers
102. Lighting Controls: Manufacturers' Seminars Round-robin Part 2 - CREE SmartCast, Crestron Dali, Eaton WaveLinx
103. Logic Diagrams and Control Sequences
104. Economics of Rooftop Solar and Storage: NABCEP Certified course
105. Universal Translator (UT3) Workshop: Software Demonstration and Interactive Lab
106. Hands On Lighting Controls Systems Workshop

107. Power, Energy and Therms: Fundamental Concepts, Monitoring Techniques and Load Disaggregation
108. Gas Heating Module 1
109. Gas Heating Module 2
110. IES Intermediate 10-Class Series: Quality Energy Efficient Lighting
111. Carbon Free Homes: Features, Benefits, Valuation
112. Energy Auditing Techniques for Small & Medium Commercial Facilities (3 Day Class)
113. MI-BEST Day 1 Building Envelope and Duct Testing
114. MI-BEST Day 2 Air Flow Measures and Static Pressure
115. MI-BEST Day 3 Refrigerant Charge Verification
116. Enclosure Systems and Materials: Unitized Curtainwall
117. MI-BEST Day 4 Building Pressures and Ventilation Verification
118. MI-BEST Day 5 Thermal By-pass, Quality Insulation Installation, Advanced Building Envelope
119. Best Practices - Lighting Audits (2-day class)
120. Building Behavior: How to Optimize Building Operations through Engagement
121. NATE HVAC/R Support Training Part 1
122. Packaged HVAC: Economizers, Compressors, Analysis
123. ACCA Manual J Equipment Selection and Sizing
124. ACCA Manual D Duct Design
125. Balanced Ventilation for Better Health, Comfort, and Energy Efficiency
126. HVAC Fundamentals: New Ideas for Novices
127. Optimizing Residential Forced - Air HVAC Systems
128. Enclosure Systems and Materials: Architectural Precast
129. Residential Heat Pumps: Quality Design and Installation
130. How to Design High-Performance Walls and Attics
131. Design for Circadian Metrics Using AGi32
132. Light and Health...and Energy Efficiency

On-Demand Class List

1. ACCA (Air Conditioning Contractors of America) Residential Quality Installation Series
2. Air Sealing for an Efficient New Home
3. Airtight Buildings
4. Attic-Roof Insulation and Air Sealing
5. Basics of Solar Electric Systems
6. Best Practices in Residential Water Heating
7. Blower Door Testing
8. Building Envelope Retrofit Strategies
9. Building Science 1.0 - Introduction and Overview of Control Layers
10. Combustion Safety and Efficiency

11. Deep Energy Retrofits
12. Design Strategies for New Buildings
13. Duct Airtightness Testing
14. Duct Efficiency Improvement
15. Electric Vehicles (EVs): What you need to know
16. Energy Efficient Windows
17. Energy Math
18. Forced-Air Systems: Quality Control
19. Home Heating and Cooling Basics
20. HVAC Quality Service
21. Insulation Overview: Selection & Installation
22. Low Cost Cooling
23. Moisture Management for Buildings
24. Residential Energy Auditing
25. Residential Indoor Air Quality (IAQ) & Ventilation
26. Selling Home Performance for Contractors
27. The Building as a System
28. Using Building Energy Simulation
29. Wall Insulation: Methods and Materials
30. Window Selection and Replacement
31. Building Science 2.1 - Introduction to Heat Transfer
32. Building Science 2.2 - Airtightness and Air Barriers
33. Building Science 2.3 - Understanding and Limiting Thermal Bridging
34. Building Science 2.4 - Introduction to Continuous Insulation and Cladding Attachment
35. Building Science 2.5 - Introduction to Windows, Curtain Walls, Window Walls and Shading Design
36. Building Science 2.6 - Introduction to Moisture and Buildings
37. Building Science 2.7 - Introduction to Psychrometrics and Condensation
38. Building Science 2.8 - Introduction to the Control of Rain and Groundwater Penetration
39. 2019 Title 24: Where We're Headed with the Non-Residential Standards
40. 2019 Title 24: Where We're Headed with the Residential Standards
41. Heat Pump Technologies for Space Conditioning and Water Heating
42. Introduction to Programmable Logic Controllers
43. Zero Net Energy Introduction & Project Showcase