

# The Value of Becoming a Certified Energy Analyst (CEA)



*Brian Selby – California Association of Building Energy Consultants*

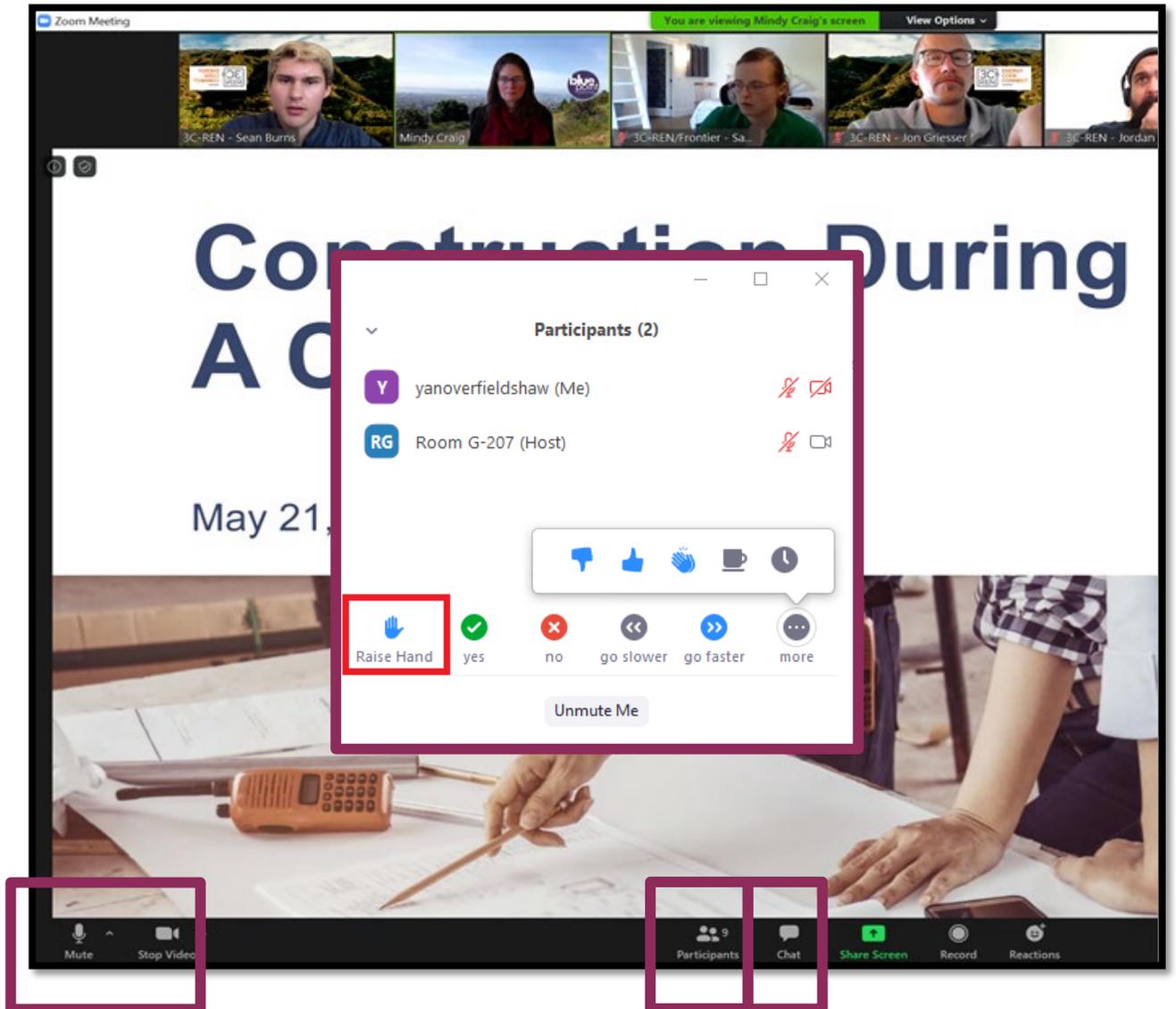
*Linda Pierce – California Association of Building Energy Consultants*

**April 5, 2022**



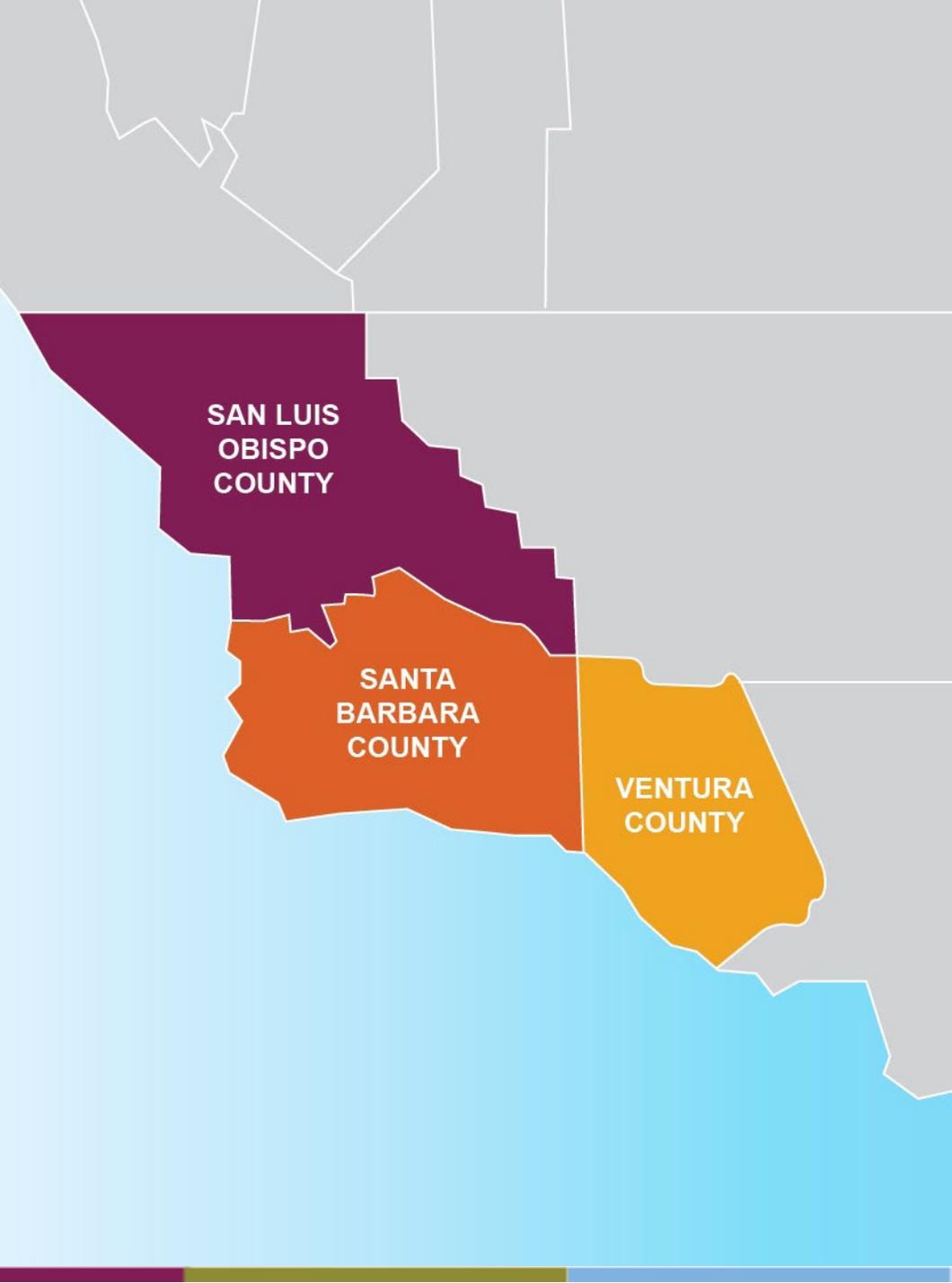
# Zoom Orientation

- Please be sure your full name is displayed
- Please **mute** upon joining
- Use "**Chat**" box to share questions or comments
- Under "**Participant**" select "**Raise Hand**" to share a question or comment verbally
- The session may be **recorded** and posted to 3C-REN's on-demand page. Feel free to ask questions via the chat and keep video off if you want to remain anonymous in the recording.



# 3C-REN: Tri-County Regional Energy Network

- Three counties working together to improve energy efficiency in the region
- Services for –
  - **Building Professionals:** industry events, training, and energy code compliance support
  - **Households:** free and discounted home upgrades
- Funded by ratepayer dollars that 3C-REN returns to the region





ENERGY  
CODE  
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BUILDING  
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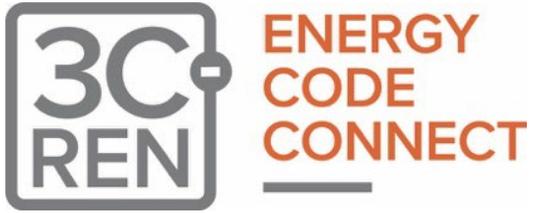
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HOME  
ENERGY  
SAVINGS

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## Energy Code Coach Texting Service Now Available!

- Text the Energy Code Coach Team your questions at (805) 220-9991
- *The Team will be responding to questions within 2 hours during normal business hours (Monday to Friday from 8 am to 5 pm).*



**Text anytime, response within one business day**  
**805-220-9991**  
Or submit online:  
**[www.3c-ren.org/ecc](http://www.3c-ren.org/ecc)**



# 3C-REN Staff Online

Need help or have questions  
about 3C-REN?

Send us a message!





# California Association of Building Energy Consultants

## The Value of Becoming a Certified Energy Analyst (CEA)

Presenter:  
Brian Selby

Selby  
Energy Inc. 

Supported by:  **Energy  
Code Ace™**  
HELPING YOU PLAY YOUR CARDS RIGHT

- ❑ Understand the role and responsibilities of documenting compliance with California's Energy Code (Title 24, Part 6).
- ❑ Understand the benefits, pathway and minimum qualifications of becoming a Certified Energy Analyst (CEA).
- ❑ Understand the importance of accuracy of energy modeling for compliance with the Energy Code.
- ❑ Understand what's being done to elevate the role of a CEA similar to that of a HERS rater, or Acceptance Test Technician



- ❑ With California being at the forefront of energy efficiency and having one of the most stringent building energy codes in the country, documenting compliance with these standards has become increasingly more complicated.
  
- ❑ Since energy saving goals set by the State largely depend on compliance with the Energy Code (Title 24, Part 6), accurate analysis and documentation is necessary to ensure these goals are achieved.



The **Documentation Author** is a person who prepares an Energy Code compliance document that must subsequently be reviewed and signed by a responsible person in order to certify compliance.

These documents include:

- ❑ Certificate of Compliance
- ❑ Certificate of Installation
- ❑ Certificate(s) of Verification or Acceptance

An **Energy Consultant** performs the same role as the documentation author, but is typically the person who is responsible for analyzing the building for compliance with the Energy Code and prepares the Certificate of Compliance (CF1R or NRCC) documentation.



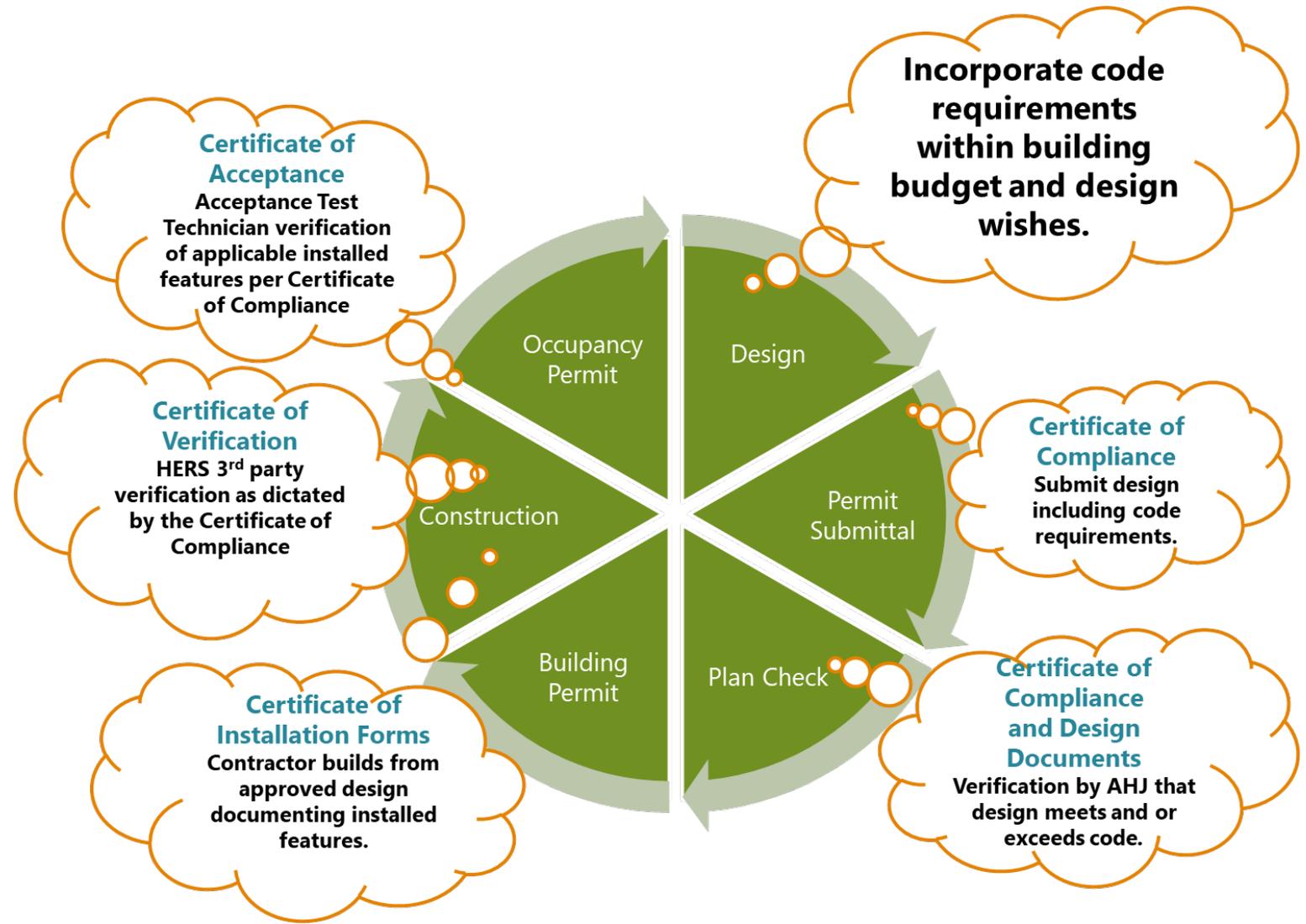
Energy Consultants play an important role in the compliance process by providing valuable guidance to design teams, builders and building occupants.

This includes:

- ❑ Assess projects and determine how best to apply Energy Code requirements.
- ❑ Determine if all applicable Mandatory requirements are met.
- ❑ Analyze buildings for compliance using the prescriptive or performance methods and determine the most cost-effective approach based on scope of work, building type and occupancy.
- ❑ Determine if applicable third-party verification and/or acceptance testing is required.
- ❑ Communicate project specific Energy Code features to the design team to be incorporated into the construction documents.
- ❑ Facilitate document registration and approval/sign-off by the Responsible Person when required.
- ❑ Resolve any Energy Code issues identified by the plans examiner (AHJ)
- ❑ Resolve any as-build changes to the building and re-analyze for compliance

Energy Consultants are typically involved in the Energy Code compliance process, beginning at the design phase throughout the plan check phase.

- ❑ May require further involvement if changes are made during construction.



Applicable Mandatory Measures must be met, always!

- ❑ May be exceeded
- ❑ Cannot traded away
- ❑ Apply to all climate zones
- ❑ Generally focus on
  - ❑ Minimum insulation levels
  - ❑ Minimum equipment efficiencies
  - ❑ HVAC distribution systems and controls
  - ❑ Ventilation systems and Indoor Air Quality (IAQ)
  - ❑ Lighting and controls
  - ❑ Solar Ready requirements



The prescriptive approach is predominately used for simple additions, alterations and some nonresidential compliance.

- ❑ Simple, but inflexible approach.
- ❑ Requirements are based on cost-effective features for each climate zone.
- ❑ Projects must meet all of the requirements or cannot use the prescriptive approach.
- ❑ The prescriptive approach sets the baseline for the performance approach (primarily envelope features).

**TABLE 150.1-A COMPONENT PACKAGE - Single Family Standard Building Design**

Single Family				Climate Zone															
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Building Envelope Insulation</b>																			
Roofs/	Option B (meets §150.1(c)9A)	Below Roof Deck Insulation <sup>1,2</sup> (With Air Space)	NR	NR	NR	R 19	NR	NR	NR	R 19									
		Ceiling	R 38	R 38	R 30	R 38	R 30	R 30	R 30	R 38									

**TABLE 150.1-A COMPONENT PACKAGE - Single Family Standard Building Design (continued)**

Build Env				Climate Zone															
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Floors	Slab Perimeter	Raised	NR	U 0.58 R 7.0															
		Concrete Raised	U 0.037 R 19																
		Quality Insulation Installation (QII)	Yes																
	Aged Solar	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD	MD		

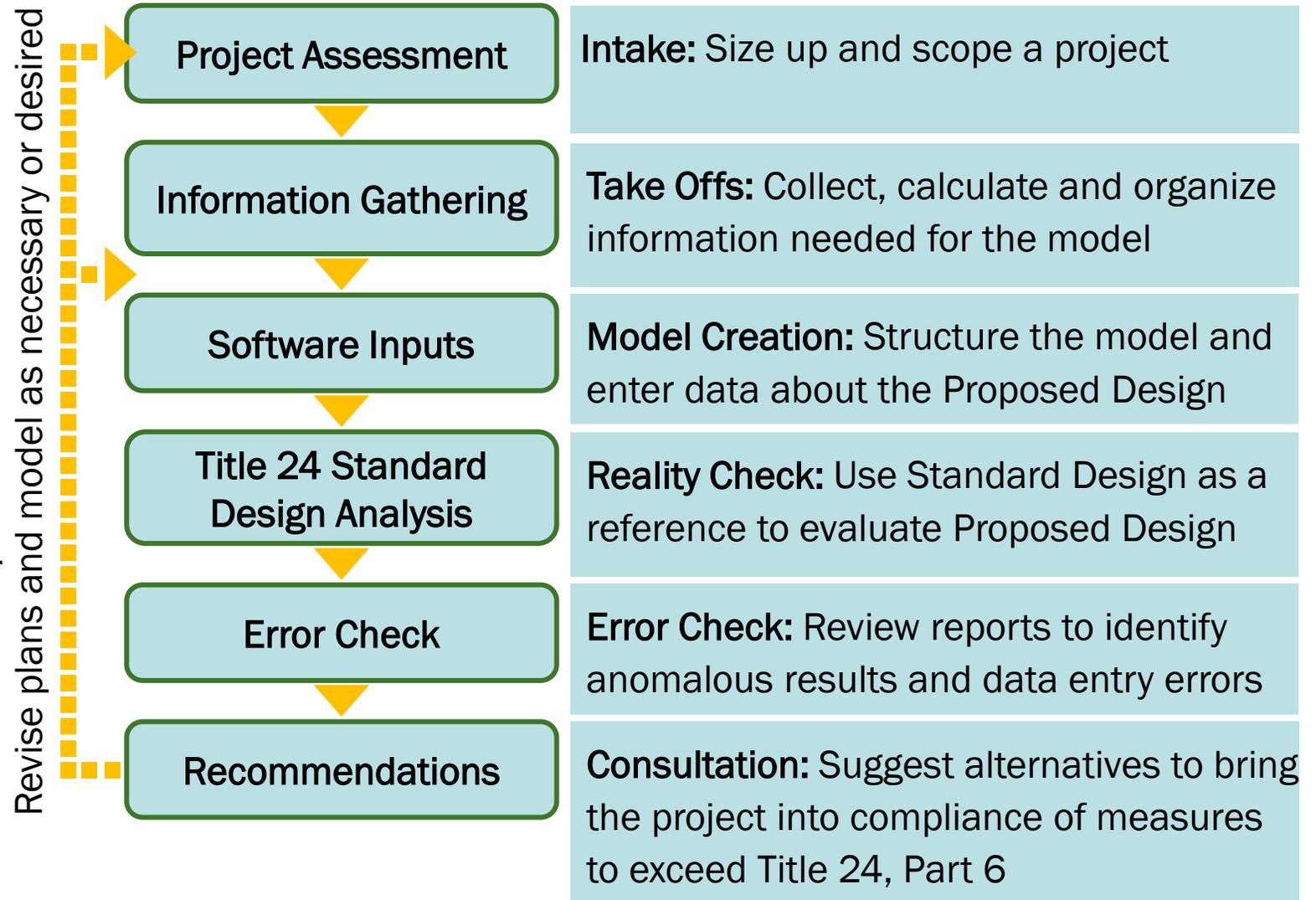
**TABLE 150.1-A COMPONENT PACKAGE - Single Family Standard Building Design (continued)**

Building Envelope				Climate Zone															
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
HVAC SYSTEM	Space Heating <sup>9</sup>	Electric-Resistance Allowed	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	
		If gas, AFUE	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	
		If Heat Pump, HSPF <sup>7</sup>	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	
	Space Cooling	SEER	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	
		Refrigerant Charge Verification or Fault Indicator Display	NR	REQ	NR	NR	NR	NR	NR	REQ	NR								
	Central System Air Handlers	Whole House Fan <sup>8</sup>	NR	NR	NR	NR	NR	NR	NR	REQ	NR								
		Central Fan Integrated Ventilation System Fan Efficacy	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	
	Ducts <sup>10</sup>	Roof/Ceiling Options B	Duct Insulation	R-8	R-8	R-6	R-8	R-6	R-6	R-6	R-8								
			§150.1(c)9A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		Roof/Ceiling Option C	Duct Insulation	R-6	R-6	R-6	R-6	R-6	R-6	R-6	R-6	R-6	R-6	R-6	R-6	R-6	R-6	R-6	R-6
	§150.1(c)9B	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ		
Water Heating	All Buildings		System Shall meet Section 150.1(c)8																

The performance approach is predominately used for new construction and complex addition/alterations.

- ❑ Establish an accurate baseline for compliance.
- ❑ Ensure compliance is met on all projects
- ❑ Make realistic recommendation for meeting or exceeding code requirements.

Currently, there are no Energy Code requirements for individuals to obtain special training, or to be certified to prepare compliance documentation.



What do we know about energy codes in California?

- ❑ Energy Code requirements are likely to get more stringent and complicated with each new code cycle.
- ❑ Energy saving goals largely depend on compliance to ensure the goals are met.
- ❑ The performance approach is predominately used for compliance, which requires a special set of skills.

While, a certification program does exist in California, the Certified Energy Analyst (CEA) Program, it has not been widely utilized as a method for ensuring accurate compliance documentation.

**CALIFORNIA'S 2019 NONRESIDENTIAL BUILDING ENERGY EFFICIENCY STANDARDS**  
CALIFORNIA ENERGY COMMISSION

The state's energy efficiency standards for new buildings and systems have been updated to ensure energy efficiency goals. The 2019 Building Energy Efficiency Standards for nonresidential buildings include both lighting and ventilation. The standards also set requirements for the first time to newly constructed health care facilities.

- HEALTHCARE FACILITIES**  
For the first time, energy efficiency standards extend to newly constructed health care facilities and require the appropriate application of standards.
- HEALTHY INDOOR AIR QUALITY**  
Energy saving technologies like high-efficiency air conditioning systems and energy-efficient ventilation systems, among others, can lead to a reduction in the fresh air that is brought into the building. The standards set an allowance for these technologies to be used, but also require that these systems be properly sized, installed, and maintained to ensure they meet the requirements.
- LIGHTING**  
Energy efficient and modern lighting solutions ensure the use of LED lighting. LED lighting is 80% energy efficient, saving energy and reducing electricity bills. Modern lighting solutions include energy-efficient lighting systems. Maintenance schedules and lighting controls should be updated as often as the standards allow to ensure energy efficiency and safety.

**CALIFORNIA'S 2019 RESIDENTIAL BUILDING ENERGY EFFICIENCY STANDARDS**  
CALIFORNIA ENERGY COMMISSION

The state's energy efficiency standards for new buildings and systems have been updated to ensure energy efficiency goals. The 2019 Building Energy Efficiency Standards for residential buildings include solar photovoltaic systems, demand response compliance options, and healthy indoor air quality. The standards also set requirements for the first time to newly constructed residential buildings.

**\$19,000 SAVINGS OVER A 30 YR. MORTGAGE | INITIAL COST \$9,500**

- SOLAR PHOTOVOLTAIC SYSTEM**  
Provides a clean, renewable energy source to newly constructed residential buildings. The system includes solar panels and a battery storage system. The solar panels generate electricity to power the home's electrical loads, including air conditioning. California is the first state in the nation to require solar systems on homes.
- DEMAND RESPONSE COMPLIANCE OPTIONS**  
Encourage battery storage and smart appliances that shift the energy use of the house from peak periods of use to off-peak periods. Demand response programs allow building owners to opt-in to receive financial incentives for reducing energy use during peak periods and help lower their energy bills.
- HEALTHY INDOOR AIR QUALITY**  
Providing healthy indoor air quality is a key goal for new residential buildings. The standards require the use of energy-efficient ventilation systems, among other measures, to ensure that indoor air quality is maintained.
- BUILDING ENVELOPE**  
The standards require that new buildings have a high-quality building envelope. This includes requirements for insulation, air sealing, and window performance. The standards also require that the building envelope be designed to reduce energy use.

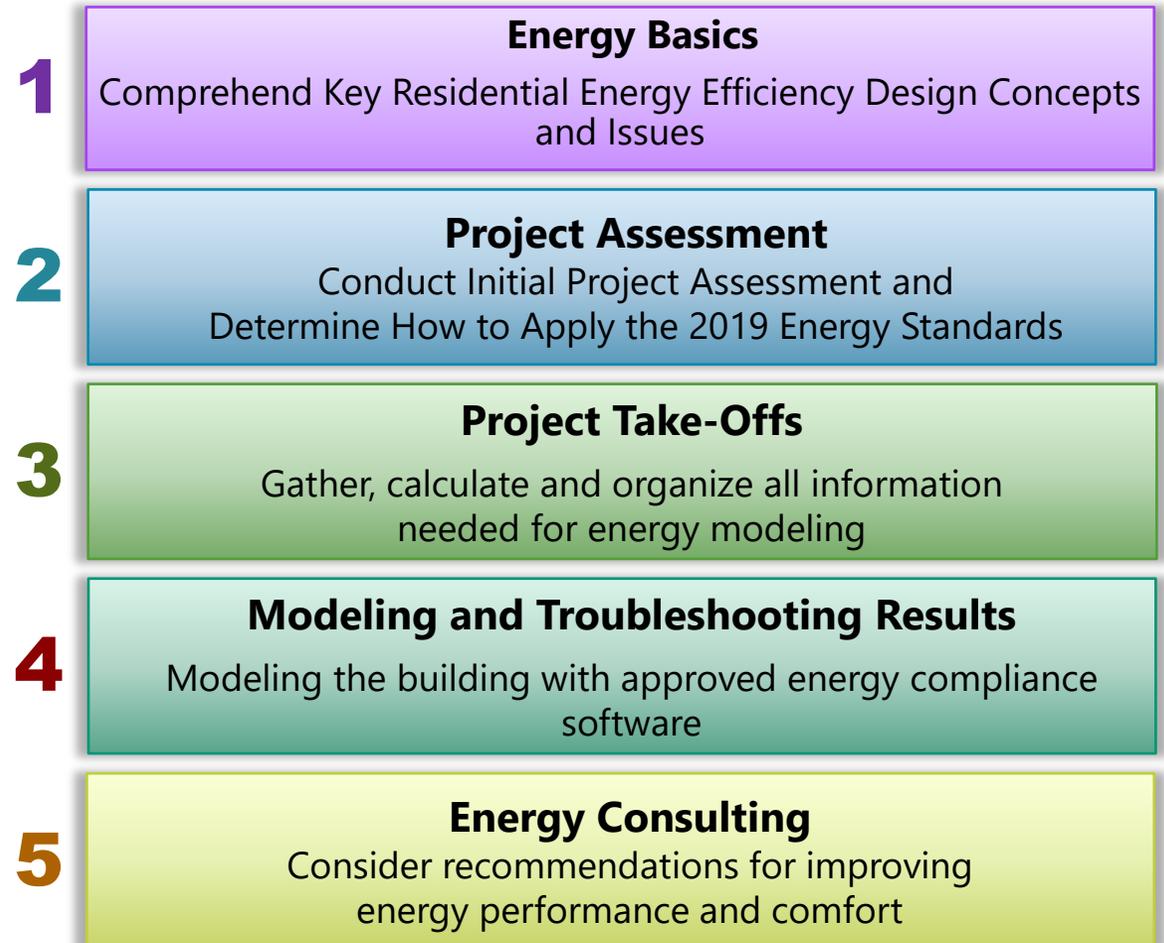
CABEC, with support from the Statewide IOU Codes and Standards (C&S) program, has developed comprehensive certification and accreditation examinations for energy consultants and others who work closely with the Energy Code.

- ❑ The **Certified Energy Analyst** (CEA) certification program developed to ensure that energy consultants maintain the knowledge, skills and abilities necessary to accurately document compliance with the Energy Code.
- ❑ The **Associate Energy Analyst** (AEA) is an accreditation program developed to help those who work closely with the Energy Code gain the work experience or energy modeling expertise needed to become a CEA.



CEA and AEA candidates must demonstrate knowledge of Energy Code compliance in five competencies.

- ❑ CEA candidates must pass a two-part exam consisting of:
  - ❑ 50 question multiple-choice exam covering five competencies.
  - ❑ Modeling exam designed to test proficiency with State approved compliance software
- ❑ AEA candidates must pass the multiple-choice portion of the CEA exam.



CEA candidates must also demonstrate they have the experience necessary to become certified.

- ❑ Attain or prove 100 points combined within these categories:
  - ❑ Must show experience as documentation author for a minimum of five projects reviewed and approved by a CEA
  - ❑ Education or other professional certifications may account for up to half of the required points.
- ❑ Maintain 9 approved continuing education units (CEU) per calendar year
- ❑ Attend professional practices workshop and adhere to the CABECs Code of Ethics.



As a condition of membership in CABEC, certification or accreditation by CABEC, all members, CEAs and AEAs agree to:

- ❑ Maintain high professional standards in performing energy related plan review and/or energy compliance calculations and the overall integrity of their work from a technical, legal and ethical standpoint.
- ❑ Provide energy calculations and documentation that are consistent with the plans and specifications used in their preparation and which conform to the energy standards for which they are prepared.
- ❑ Demonstrate unbiased judgment in the performance of my work, including disclosing to a client or employer any circumstance that could be construed as a conflict of interest and ensuring that such conflict does not compromise the interests of the client or employer.
- ❑ Compete fairly with other CEAs/AEAs, including recognizing and giving credit to others for the professional work they have performed, and not offering or accepting improper contributions or gifts to obtain or grant work or to influence the judgment of others.
- ❑ Abide by the decisions of the CABEC Board of Directors with respect to the certification process and any complaint review procedures adopted by the Board.

In addition to professional recognition, several Utility incentive programs, green building programs and local reach codes have relied on the CEA Program to ensure the accuracy of compliance documentation.

These include:

- ❑ California Advanced Homes Program (CAHP)
- ❑ Advanced Energy Rebuild (AER) Program
- ❑ Roseville Advanced Homes Program (RAHP)
- ❑ SMUD Smart Homes
- ❑ Reach Codes (jurisdictions vary)
  - ❑ As of June 1, 2020: Hayward, Milpitas, Palo Alto, San Jose, Santa Monica
- ❑ California Tax Credit Allocation Committee (CTCAC)
- ❑ Low-Income Housing Tax Credit Program
- ❑ City of Santa Ana (nonres third-party plan check)
- ❑ Department of State Architect
- ❑ Nonresidential New Construction Incentive Program



The Energy Code Ace Web site is developed and provided by the California Statewide Codes & Standards Program, which offers free energy code training, tools and resources for those who need to understand and meet the requirements of Title 24, Part 6 and Title 20.

## Ace\*Tools™

*A suite of interactive tools to help you understand the compliance process, required forms, installation techniques and energy efficiency regulations applicable to building projects and appliances in California.*

***Find Tools***

## Ace\*Training™

*A portfolio of on-demand, and live in-person and online training alternatives on California's Energy Code and Title 20 regulations, tailored to a variety of industry professionals and addressing key measures.*

***Find Training***

## Ace\*Resources™

*An array of downloadable materials providing practical and concise guidance on how and when to comply with California's building and appliance energy efficiency standards.*

***Find Resources***

CABEC has collaborated with Energy Code Ace to bring reference and training materials together for CABECs **Residential Mentorship Program** to help candidates prepare for becoming CEAs.

- ❑ Mentor interactions are the primary feature of the program that distinguish it from other educational offerings
  - ❑ planned at key points within each Flight Plan, during or following a block of completed training
- ❑ Each Flight Plan is designed to map to the CEA exam competencies
- ❑ Mentee's can learn valuable knowledge from the mentor's expertise and lessons learned

Energy Code Ace training courses offer a great way to stay up to date on California's building and appliance energy efficiency standards, and ahead of your competition.

While some classes target "hot topic" measures, others focus on specific audience groups, helping them do their job better by knowing how to comply with Title 24, Part 6 and Title 20. Courses are provided in a variety of formats.

**2019 ENERGY CODE Ace Training Flight Plan**

**Envelope, Solar Systems & Lighting**

**Now Boarding for Ace-ville!**  
Complying with California's Energy Code can feel turbulent. Let the crew at Energy Code Ace smooth the skies with our no-cost training. Use our Flight Plans to navigate our world of classes and set a course for Ace-ville.

**Touch Base: Residential Envelope, Solar Systems & Lighting**

**Residential Standards for Energy Consultants**

**Residential Solar Systems**

**Residential Building Envelope**

**Residential Lighting**

**Residential Envelope & Solar Systems**

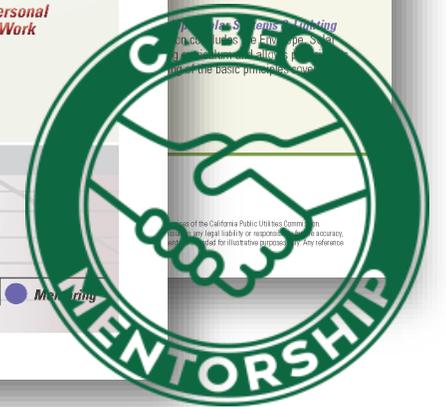
**Personal Work**

**Feedback Personal Work**

**TRAINING DELIVERY METHOD LEGEND**

- Traditional Classroom
- Online Self-Study
- Virtual Classroom
- Workshop
- Independent Study
- Mentorship

Course and delivery method descriptions on the back. Check it out!



In May of 2017, the CEA Assessment research project was proposed to PG&E Codes & Standards program manager Jill Marver with the goal of increasing the value of compliance documentation prepared by CEAs.

What we set out to achieve:

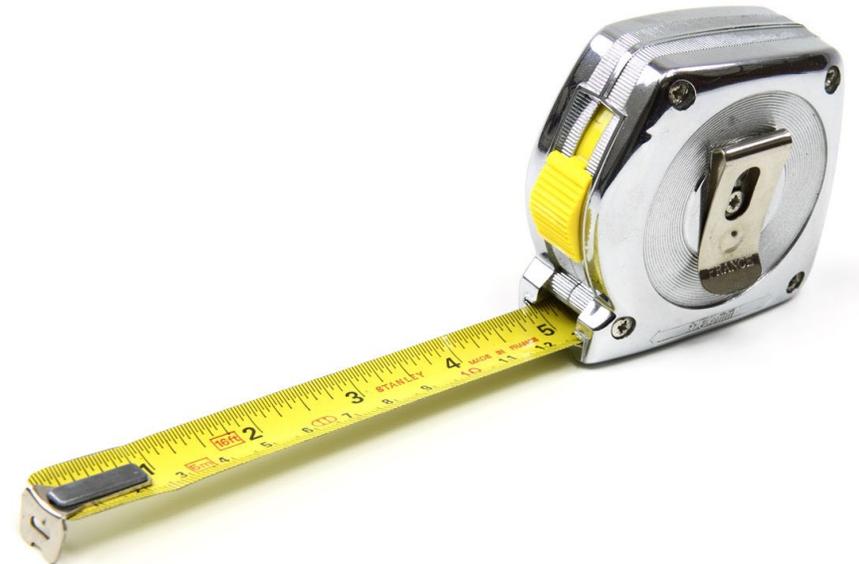
- ❑ Elevate the role of Certified Energy Analyst (CEA) similar to that of a HERS rater, or Acceptance Test Technician.
- ❑ Making it a requirement that Energy Code compliance documentation be prepared by a CEA.
  - ❑ Short term goal – Reach Code requirement
  - ❑ Eventually – Energy Code requirement



**Research Hypothesis:** Compliance documentation prepared by a CEA is more accurate and complete than those prepared by non-certified energy consultants.

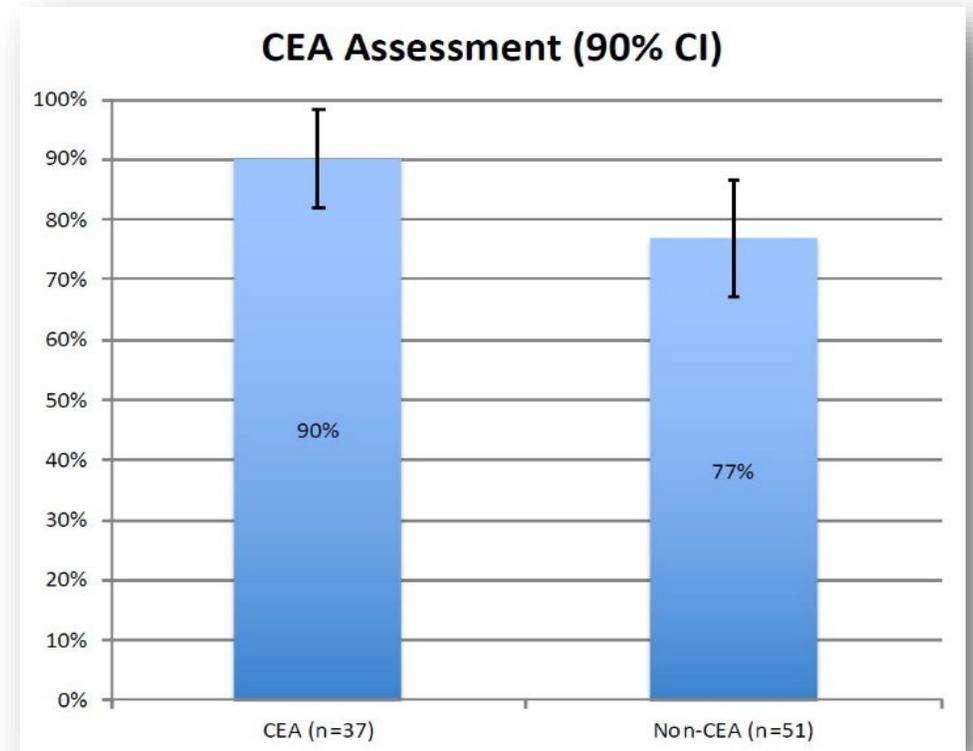
Our initial research questions included:

- Is there evidence that supports the hypothesis?
- Can the accuracy of compliance documentation be measured?
- What sources are available for evaluating compliance documentation?
- Are there any issues, or barriers to overcome to achieve the research goals?



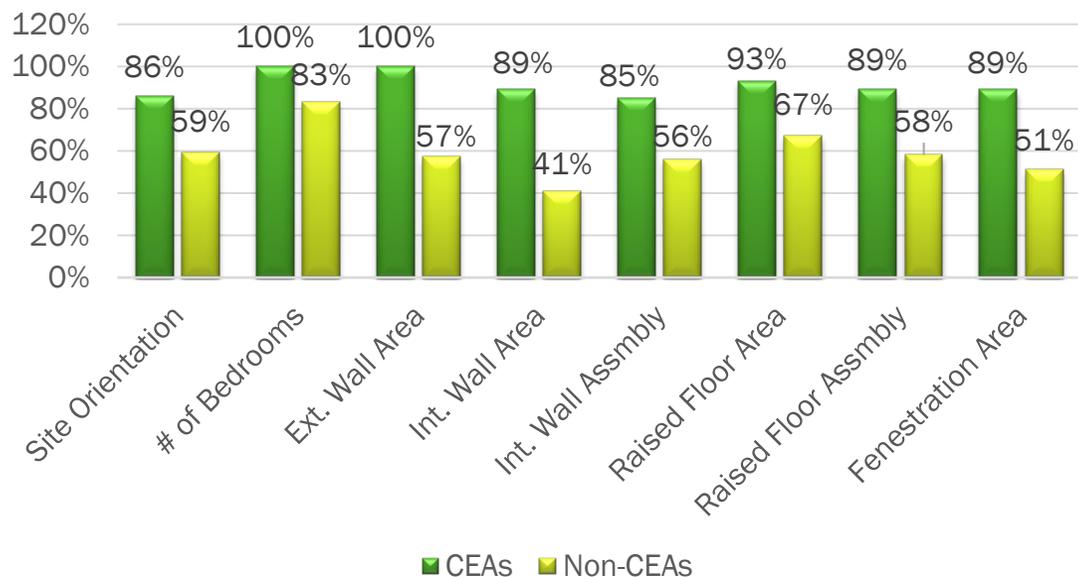
Where we're at with the CEA Assessment research project

- ❑ Meticulously collected data for approx. 88 residential new construction projects.
  - ❑ 37 from CEAs, 51 from non-CEAs
  - ❑ 9 different building departments in Northern CA
  
- ❑ Results indicate that overall CEAs were more accurate on average!
  
- ❑ However, it did not indicate a statistically significant difference at a 90% confidence interval (CI)
  
- ❑ So... we dug a little deeper!

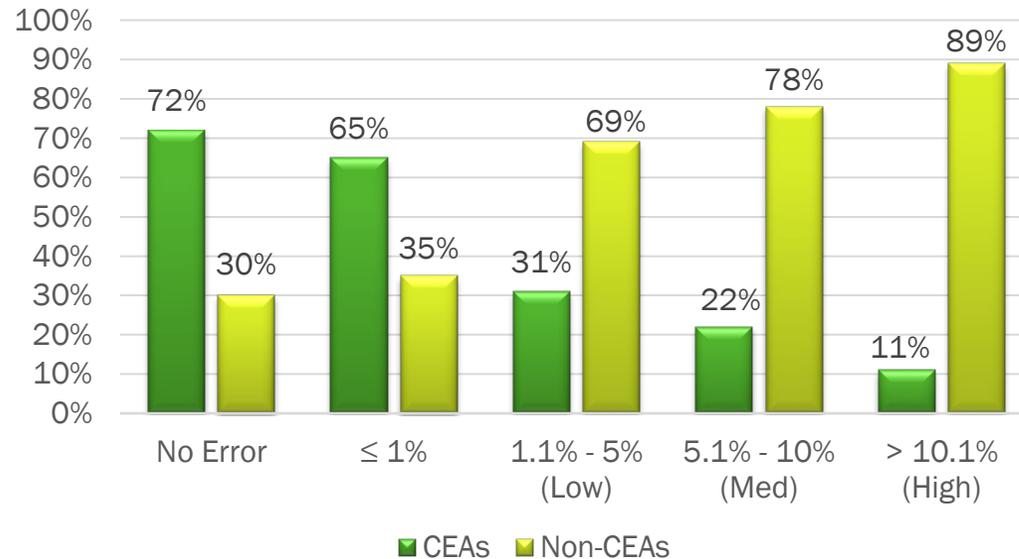


Research data were also analyzed by the team according to the analysis plan to determine individual data point results and magnitude of individual modeling errors. Results shown below represent only those data with a significant statistical difference between CEAs and non-CEAs.

### Individual Measure Accuracy



### Magnitude of Fenestration Area Error



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Energy Code Ace	Information	info@energycodeace.com	
Energy Commission	Hotline	title24@energy.ca.gov	800-772-3300



# More Information

- **1.5 AIA LU's Available**
- **1.5 ICC LU's Available**
  - Contact [spburns@countyofsb.org](mailto:spburns@countyofsb.org) for any questions regarding LUs
- **Coming to Your Inbox Soon!**
  - Slides, Recording, & Survey – Please Take It and Help Us Out!
- **Upcoming Courses**
  - 4/14 - Home Performance: Tools of the Trade
  - 4/21 - 2022 Residential CEA Exam Prep Workshop
  - 4/21 - All About ADU's for Households
  - 4/21 - DIY Home Energy Savings Toolkit
  - 4/22 - 2022 Nonresidential CEA Exam Preparation Workshop
  - 5/10 - All Electric Construction Part 1: Heat Pumps For Heating and Cooling





**Thank you!**

For more info:  
[3c-ren.org](https://3c-ren.org)

For questions:  
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SAN LUIS OBISPO • SANTA BARBARA • VENTURA