



CPUC Workforce Education and Training Program

Partnerships with Training Institutions Evaluation Report

February 10, 2023

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1. Introduction

This report is an evaluation of the California Public Utilities Commission's (CPUC) Workforce and Education Training (WE&T) Program, specifically the Integrated Energy and Education Training (IEET) Collaborations implemented by the California Investor-Owned Utilities (IOUs) and third-party collaborators in the state. The WE&T Program's chief objective is "to provide the human capital necessary to achieve California's economic energy efficiency [EE] and demand-side management potential." Through Collaborations between IOUs and third-party organizations, the CPUC aims to bolster the State's energy workforce by extending education and training opportunities across a wide variety of communities. IEET has two components—Technical Upskill and Core Energy Education Collaboration (CEEC), whose primary target populations include people in an EE-related career seeking to improve upon their technical skills; college students and apprentices on post-secondary education tracks working to obtain or enhance an energy career; and/or disadvantaged workers seeking certifications to enter the energy workforce or technical upskilling for those who have already entered the energy industry

As it pertains to the WE&T Program, the IOUs developed criteria for what constitutes a Collaboration.¹ To qualify as a Business Plan Metric Collaboration, a Collaboration need to achieve at least one of the following:

- **Contribute to expanding WE&T's reach.** This means reaching new people and/or reaching more people. In either case, it is reaching the targeted people with the right materials, as opposed to the general audience where anyone can attend.
- **Develop/Disseminate/Co-develop products and resources.** Demonstrate that products and or resources were either developed from scratch or that existing materials were significantly modified to meet the needs of a mutually important target audience.
- **Leverage strengths.** Each organization helps the other do or provide something to members of the energy workforce (teachers, engineers, technicians, building operators, etc.) that the other organization(s) are not able to accomplish on its/their own.

Additionally, after reviewing the sources included in Appendix A for the literature review portion of this evaluation (see Section 2.3), the evaluation team created the following succinct definition of a Collaboration:

Collaboration: *An arrangement, working relationship, or set of agreements between two or more organizations involved in a joint endeavor in which all organizations willingly participate to further mutual interests. All parties involved consider themselves as part of a team, where member organizations contribute toward shared outcomes through specific roles and responsibilities that have been defined and agreed upon by all participating organizations. The relationship between collaborators should be fundamentally nonhierarchical and decision-making should be shared based on knowledge and expertise.*

Evaluability Assessment

As a first step of this effort, Opinion Dynamics completed an evaluability assessment to examine the extent to which WE&T Collaborations could be evaluated reliably and credibly in the future. There were three main considerations in conducting this assessment: usefulness, plausibility, and feasibility. The result of our evaluability assessment is detailed in Table 1.

¹ PG&E, 2019, p. 1

Table 1. Evaluability Assessment

Assessment Questions	Conclusions
Would an evaluation be useful, and would findings be utilized?	Opinion Dynamics concluded that an evaluation of the effectiveness of WE&T collaborations would be useful because it would create a framework to help IOUs continue to build successful and measurable collaborations with third parties and maximize their benefits regarding advancing programmatic outcomes.
Is it plausible to expect intended outcomes?	Through the in-depth analysis of the IEET program theory, Opinion Dynamics concluded the program theory and the linkages of program activities to short- and long-term outcomes were plausible.
Is it feasible to assess or measure the intended outcomes?	After conducting in-depth interviews of collaboration representatives and utilizing a case study approach, Opinion Dynamics determined it was feasible to conduct this evaluation.

After determining an evaluation would be useful to help IOUs continue to build successful collaborations and that it is plausible to expect intended outcomes, the evaluation team decided to utilize a case study approach as the best way to feasibly assess the intended outcomes. In the remainder of this report, we outline research methods, results, key findings from this evaluation and subsequent recommendations for improving WE&T Collaborations in the future.

Key Findings and Recommendations

We have included several key findings and related recommendations from this study below.

- **Finding:** Statements of Collaboration create a framework to encourage collaborators to clearly articulate goals and outline organizational roles and responsibilities. Most include: a narrative description of the Collaboration’s goals, a list of what each organization involved will do in support of the Collaboration, and a list of individuals involved from each organization. While these statements capture some basic information, they could be augmented to document information in a more systematic and detailed way that would aid in the development of new Collaborations.
- **Recommendation:** Statements of Collaboration should include detailed data collection and sharing plans that specify key performance indicators (see Table 8). While at present some statements include this information in the narrative description of what each organization is responsible for, we recommend creating a separate field that ties each activity within a Collaboration to performance indicators, identifies which organization is responsible for tracking those data, and documenting other relevant details. For example, collaborators may agree to conduct anonymized pre- and post-participation surveys with those that received training through a Collaboration to serve as a key performance indicator. This type of data collection and reporting may be particularly useful where collecting and storing personal information is not feasible (see SCE and CRAF case study in Section 4.1). This type of specific documentation will greatly improve decision makers’ ability to assess progress towards intended outcomes. Table 18 provides an example of a systematic means of tracking these details in each Statement of Collaboration.

Table 2. Example Activity Documentation for Statement of Collaboration

Example Variable	Activity	Third-Party Responsible	Description	Time Period (i.e., start and end dates)	Key Performance Indicator	Reporting and Tracking
Description	Specific deliverable or activity	Organization responsible	Narrative description of	Period when activity or deliverable is	Metric agreed upon by collaborators	Method and cadence for tracking

Example Variable	Activity	Third-Party Responsible	Description	Time Period (i.e., start and end dates)	Key Performance Indicator	Reporting and Tracking
	undertaken as part of the Collaboration	for activity or deliverable	activity or deliverable	expected to start and end	to track progress of activity or deliverable	performance metric

- **Recommendation:** Statements of Collaboration should also clearly specify Collaboration type along with the desired outcome for ease of understanding the entire landscape of current and past WE&T Collaborations. Based on our review of current Collaborations, we identified six key Collaboration types based on their desired outcomes; those focused on curriculum development, building student awareness, technical training, building training capacity, providing tool or equipment loans, and helping students acquire certifications (see Section 3.3). We note that this list of Collaboration types may not be exhaustive, and IOUs may elect to expand upon the types of Collaborations in the future. Further, IOUs should work closely with third parties as they establish Collaborations to document the types of key performance indicators or outputs that most clearly demonstrate progress towards their desired outcomes (we list outputs associated with each Collaboration type in Table 8 below). This type of strategic exercise completed when IOUs and/or third parties initiate a Collaboration can help decision makers plan and support appropriate data collection to measure progress towards desired outcomes and continuously improve offerings.
- **Finding:** While many Collaborations track information related to participants and key performance indicators, data tracking is not uniform across all Collaborations; and, in a number of cases, collaborators do not collect adequate data to enable any assessment of progress towards their intended outcomes. Third-party collaborators have a range of capabilities when it comes to tracking and sharing data—that is, some organizations may have the resources to purchase and maintain data collection and storage software or infrastructure while others do not. As such, some third-party Collaborators may require more support from IOUs to be able to track and report on key performance indicators.
- **Recommendation:** When initiating Collaborations, WE&T staff at IOUs should clearly specify data tracking and sharing processes and procedures. Processes should also be specified in Statements of Collaboration, along with other information already included in those documents. WE&T staff should also explore additional sources of data that third parties may be amendable to sharing (i.e., data that may be collected outside of the formal Collaboration) that could help support the Collaboration directly or indirectly through evaluation. For example, our team learned that SDCC may track additional information related to career paths, satisfaction, and other dimensions for students who received free BSP manuals and exam codes; however, it is unclear if SDG&E incorporates these data into their program tracking database related to Collaborations (see Section 4.2). In other cases, IOUs should provide support for third parties to enable adequate data tracking and sharing to support the Collaboration.
- **Recommendation:** Collaborations of the nature facilitated by IOUs see results of their work over longer periods of time and, as such, IOUs should consider supplemental data collection (i.e., in addition to data collected by individual collaborators) to aid in assessing both the quality and functioning of Collaborations, but also their impacts. WE&T Program staff at IOUs should consider periodic surveys with staff at third parties, or another systematic way of documenting “lessons learned,” to build a broader understanding of what works well and where WE&T staff may have room to improve Collaborations. In most cases, the WE&T Program engages with third-party organizations for the purpose of reaching communities or populations with whom those organizations have established

trust. Decision makers at IOUs can leverage this expertise in a more systematic way by creating a venue for representative of these organizations to provide succinct and targeted feedback.

- **Finding:** The criteria for what constitutes a Collaboration developed by IOUs (see Section 1) primarily focus on the types of activities that Collaborations will aim to achieve. As such, they do not provide much value in helping IOUs think strategically about what outcomes each Collaboration aims to achieve and whether Collaborations will ultimately be of the most value when it comes to serving specific targeted groups in new and different ways. Further, these criteria largely focus Collaborations on granting more access to individuals and groups of people that are otherwise unable to take advantage of WE&T programming. However, it is unclear what groups of people do and do not currently have access and, as such, difficult for stakeholders to understand if and how Collaborations that satisfy the current criteria enable WE&T to serve people outside of those they currently serve.
- **Recommendation.** As these criteria are largely focused on developing new offerings to target populations outside of those that currently have access to WE&T offerings, we recommend that future research related to these Collaborations, or WE&T more broadly, focus on identifying the baselines for number of people and the types of populations currently served through WE&T programs and that these Collaborations aim to serve. This type of research would enable IOUs and stakeholders to have a starting point from which to both identify which Collaborations may be of most strategic benefit and measure the relative success of individual Collaborations. Further, this sort of exercise can help decision makers be more strategic about which Collaborations may be most beneficial to help achieve medium- or long-term goals. For example, establishing quality baselines can help IOUs understand which populations they may be underserving or which outcomes (see Table 8) need more support through initiating Collaborations.
- **Recommendation.** We recommend that IOUs reframe their Collaboration criteria to be more focused on the types of outcomes that Collaborations aim to achieve (see Table 8). That is, Collaborations should be focused on achieving one or more of the short- medium- or long-term outcomes specified in the program theory and logic model for the Integrated Energy Education and Training sub-program.²

2. Methods

Opinion Dynamics aimed to address the research objectives through the corresponding evaluation methods as presented in Table 3.

Table 3. Objectives and Tasks

Research Objective	Program Material and Data Review	Program Staff Interviews	Literature Review	In-Depth Interviews with Representatives from Collaborations	Case Study Development
Define the term collaboration		✓	✓		
Identify collaboration types	✓	✓		✓	
Map existing and planned collaborations to collaboration types	✓	✓		✓	
Determine evaluability of collaborations	✓	✓			

² Opinion Dynamics. (2020). *Logic Models for Workforce Education & Training’s “Integrated Energy Education and Training” Sub-Program Components and Linkage Explanation*: https://www.calmac.org/publications/Explanation_of_Logic_Model_Links_4.28.20_Final.pdf

Research Objective	Program Material and Data Review	Program Staff Interviews	Literature Review	In-Depth Interviews with Representatives from Collaborations	Case Study Development
Understand the functioning of Collaborations with workforce training and job placement organizations				✓	✓
Characterize how collaborations are being implemented				✓	✓
Determine and measure collaboration effectiveness indicators	✓	✓		✓	✓
Assess the impacts (e.g., gross energy savings, job placement and job creation) of WE&T collaborations					✓

2.1 Material Review

The evaluation team reviewed specific program materials from all four IOUs to understand the landscape of active Collaborations between IOUs and third-party organizations. Materials consisted of *Statements of Collaboration* or *Collaboration Agreements* detailing the goals, roles and responsibilities and other key information related to each Collaboration. Additionally, these materials provided context for some of the core data collection and documentation processes for Collaborations initiated through the WE&T Program. Table 4 lists all the materials received across all four IOUs, including Statements of Collaboration and Collaboration Agreements representing a comprehensive list of all 23 Collaborations that were active at the time of this evaluation (as of June 2019).

Table 4. WE&T IOU Collaboration Materials

IOU	Materials Received
Pacific Gas and Electric (PG&E)	10 Statements of Collaboration <ul style="list-style-type: none"> ▪ Culinary Training Collaboration ▪ Campus Staff and Faculty (several CA colleges in the region)^a ▪ IUOE Stationary Engineers, Local 39 ▪ Illuminating Engineering Society ▪ New School of Architecture and Design ▪ California Polytechnic State University ▪ Building Operator Certification® (BOC) Collaboration Agreement³ ▪ Northwest Energy Efficiency Council (NEEC), Southern California Workforce Development Board (SCWDB), and BOC for Disadvantaged Workers ▪ Center for Ecoliteracy on a K–12 Culinary Training Program
San Diego Gas and Electric (SDG&E)	1 Statement of Collaboration <ul style="list-style-type: none"> ▪ San Diego City College

³ All product or company names that may be mentioned in this publication are tradenames, trademarks, or registered trademarks of their respective owners.

IOU	Materials Received
Southern California Electric (SCE)	7 Summaries of Collaboration <ul style="list-style-type: none"> ▪ College of Sequoias HVAC Technician Program, Programmable Logic Controller/Automation Program, Irrigation Certified Program and Energy Education Center Tulare^b ▪ Orossi High School Pathways Program ▪ California Restaurant Association Foundation ▪ Homeboy Industries ▪ Table Top Induction Range Lending Program
Southern California Gas (SoCalGas)	5 Statements of Collaboration <ul style="list-style-type: none"> ▪ Center for Ecoliteracy ▪ California Restaurant Association Foundation (CRAF) ▪ C-CAP Industry Readiness Training ▪ Natural Gas Commercial Foodservice Equipment Installers Certification ▪ Foodservice Collaboration with California Community Colleges

^a Includes two Statements of Collaboration

^b Includes three separate Statements of Collaboration for each College of Sequoias program

2.2 Program Staff Interviews

The evaluation team conducted four IOU program staff interviews to establish a better understanding of collaboration dynamics, including roles and responsibilities, shared goals, development plans, and processes for collecting and tracking data. Additionally, interviews with staff helped to confirm our team’s understanding of the overall objectives of WE&T Collaborations and provided insight into how WE&T staff planned to expand the reach of WE&T Programs to target populations through these Collaborations.

2.3 Literature Review

Opinion Dynamics conducted a review of secondary sources from the energy industry and other fields (e.g., global health, infrastructure, and governance) related to partnerships and collaborations (see Appendix A for reference list). The main objectives for this review were to create a clear definition of a collaboration and identify the best practices for successfully evaluating collaborations. The evaluation team studied and reviewed several scholarly articles in addition to studies on partnerships and collaborations from a range of different fields. Section 3 of this report contains our comprehensive definition for collaboration and several important considerations specific to the evaluation of WE&T collaborations, including IOU collaboration criteria, distinct stages of development, and key attributes.

2.4 In-Depth Interviews with Collaboration Representatives

Opinion Dynamics conducted in-depth interviews with representatives of third-party organizations that engaged in Collaborations with IOUs. The main goals of these interviews were to gather primary insight into collaboration function, implementation, execution, and performance. Specifically, through these conversations we gained valuable insight into the processes involved with initiating and administering the different Collaborations—how and why collaborations formed, details of their intended outcomes, roles and responsibilities of those involved, and communication plans, among other details. Table 5 below summarizes the number of interviews our team conducted and the corresponding number of Collaborations those

interviews represented. Of 23 total Collaborations included in this study, our team completed interviews with 16 individuals, representing 16 Collaborations.

Table 5. In-Depth Interviews

IOU	Total Collaborations	IOU Interviews		Third-Party Interviews ^b	
		Interviews ^a	Collaborations Represented	Third-Party Interviews	Collaborations Represented
PG&E	10	5	10	8	7
SCE	7	2	7	4	4
SoCalGas	5	3	5	3	4
SDG&E	1	1	1	1	1
Total	23	11	23	16	16

^a IOU Interview quantities include phone conversations and follow-up email questionnaires with WE&T Program staff and Collaboration leads at IOUs. Some staff members across the IOUs are responsible for leading more than one Collaboration. As such, seven total interviews included discussion of two or more Collaborations.

^b In several cases, representatives from third-party organizations spoke to multiple Collaborations across IOUs.

2.5 Case Study Development

Through the information gained from the in-depth interviews, the evaluation team selected four Collaborations as case studies for further in-depth study. Table 6 outlines those selected collaborations, their targeted outcomes and the research questions and activities specific to each case study. Section 2.6 provides a discussion of study limitations, many of which prevented us from fully characterizing each Collaboration and their impacts through these case studies.

Table 6. Collaboration Case Studies Intended Outcomes and Measurable Outputs

Collaboration	Intended Outcomes	Research Questions	Research Activities
SCE and CRAF	Train both high school students and teachers in the latest high-performance commercial food service technology (e.g., convection ranges, combination ovens, steamers, etc.) to help give students (both directly and through “train-the-trainer” initiatives) hands-on experience and knowledge that they can apply to a future career in food service after graduation.	<ul style="list-style-type: none"> Do students (both current and former) who work with commercial food service equipment regularly employ the skills they learned through this Collaboration in their career? How have the knowledge and skills that students obtained through this Collaboration impacted their career trajectory? How does this Collaboration help SCE expand the reach of their WE&T offerings? 	<ul style="list-style-type: none"> Web survey with participating (former) high school students In-depth interviews with participating teachers
SDG&E and San Diego City College (SDCC)	Provide enrolled college students with the Building Science Principals (BSP) Reference Guide and BSP examination codes at a discounted rate to prepare them for Building Performance Institute (BPI) certification,	<ul style="list-style-type: none"> Would students who receive free BSP exam codes complete the exam in the absence of this Collaboration? Do the materials provided through this Collaboration (e.g., BSP Reference Guide) lead to better educational outcomes? 	<ul style="list-style-type: none"> Course material review Web survey with participating SDCC students. Program tracking data review

Collaboration	Intended Outcomes	Research Questions	Research Activities
	while also promoting WE&T trainings at SDG&E's Energy Innovation Center.	<ul style="list-style-type: none"> Do students who receive exam codes participate in other WE&T offerings (e.g., energy center courses or tool lending library)? 	
PG&E, the NEEC and the Sacramento Employment and Training Agency (SETA)	Expand one or both organizations' reach by leveraging existing training materials and resources, developing new training materials and resources and leveraging each other's abilities to attract the appropriate members of the workforce. Specifically, to assist un- or under-employed workers entering the workforce.	<ul style="list-style-type: none"> Are trainees gainfully employed in building operations careers and have they experienced career growth since participating in the BOC training? Does this Collaboration provide opportunities for participants who are either un- or under-employed to enter or advance in the building operations field? How has this Collaboration helped PG&E expand the reach of its WE&T offerings? 	<ul style="list-style-type: none"> Review of BOC training materials In-depth interviews with BOC training participants In-depth interviews with employers
SoCalGas and the International Association of Plumbing and Mechanical Officials (IAPMO)	Train current and future natural gas equipment installers to install equipment in commercial food service kitchens and increase the supply of quality installers using the Natural Gas Equipment Installers Certification.	<ul style="list-style-type: none"> Are participating students gainfully employed in a commercial food service career that involves installation and maintenance of natural gas equipment? How has students' engagement with IAPMO, either through a course or a certification, impacted their career trajectory? 	<ul style="list-style-type: none"> Review IAPMO training materials In-depth interviews with IAPMO training staff In-depth interviews with training participants

2.6 Study Limitations

The evaluation team originally planned to utilize the case study approach to conduct an evaluation that assessed the effectiveness of individual WE&T Collaborations and characterized how some Collaborations achieve their intended outcomes. Based on the in-depth interviews conducted with IOU staff and third-party representatives, we found the Collaborations listed in Table 6 to be best suited for our case study approach and evaluable in terms of measurable impacts and outcomes. The evaluation team submitted primary and secondary data requests to IOU and third-party staff to begin to assess collaboration performance and effectiveness. In two cases, our primary data collection efforts were unsuccessful due to lack of participant responses. In two other cases, however, IOUs and third-party collaborators were unable to provide data necessary to complete the impact evaluation activities the case studies. Specifically, for the SCE and CRAF Collaboration the teams did not track the data necessary to for the evaluation team to contact participants⁴; neither SoCalGas nor IAPMO Collaboration, responded to our data requests. Consequently, this evaluation did not assess the impact of each selected case study, as originally intended.

⁴ We note that some of the core participants at the time of the SCE and CRAF Collaboration were minors (i.e., K-12 students) and so tracking personal information for some participants of this Collaboration may not have been appropriate.

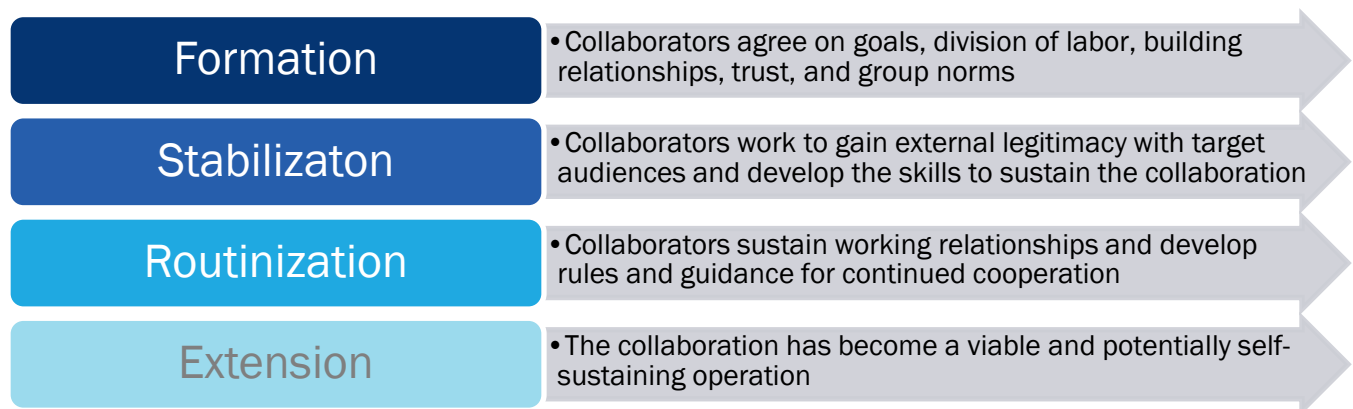
3. Evaluating Collaborations

Opinion Dynamics developed a framework for evaluating collaborations based on a review of secondary sources, and interviews with WE&T Program staff. In the subsections that follow, we highlight different aspects of this framework, specifically, the different stages through which a collaboration develops, key attributes of successful collaborations and our recommended categorization of existing WE&T Collaborations based on their intended outcomes.

3.1 Four Stages of Development

Based on our literature review, we found collaborations typically move through four specific stages of development while becoming viable and self-sustaining operations. Figure 1 outlines these four stages of development for typical partnerships and collaborations.⁵

Figure 1. Collaboration Development



During the early stages of development, those involved with a collaboration are building relationships, establishing norms, and setting near- and longer-term goals for their work. As the foundation of the collaboration solidifies, the group moves into the subsequent stages of development. Groups do not always move into the later stages of development—that is, the routinization and extension stages. However, at these later stages, collaborations often become more viable as the parties involved start to see some level of success. Individuals involved can move into addressing remaining process challenges rather than devoting all their efforts to establish basic processes and make headway within the target populations of interest.

When evaluating WE&T Collaborations, it is important to consider how groups evolve and relationships mature as well as how group development may change the effectiveness of Collaborations over time. At earlier stages of development, it may be more prudent for evaluation to focus on the strength of the Collaboration itself and the theory behind the specific activities in which the Collaborations engage, rather than whether groups make immediate and measurable progress towards their intended outcomes. As such, WE&T Collaborations would benefit from an evaluation using a longer evaluation period to measuring progress towards outcomes given how long it may take certain Collaborations to develop. This may involve research approaches with longitudinal components or periodic data collection to measure progress over time. “Time series analyses, panel studies, retrospective approaches, and other methods that appraise temporal issues would be particularly useful.”⁶

⁵ Mendell and Keast. 2008, p. 715-731

⁶ Emerson & Nabatchi. 2015, p. 186

Where these types of methods are not feasible, evaluators should, at the very least, understand the stages and trajectory of collaborations when interpreting and/or analyzing results.⁷ All of these evaluation approaches require regular and varied data collection and tracking, a key attributes of successful collaborations and partnerships (Section 3.2).

3.2 Key Collaboration Attributes

Opinion Dynamics conducted a review of secondary sources from the energy industry and other fields (e.g., global health, infrastructure, and governance) related to partnerships and collaborations (list of sources included as Appendix A). Based on this review, the evaluation team determined the following key attributes of a successful WE&T Collaborations (Table 7). Several of these attributes are subjective and, as such, may require a distinct qualitative assessment for each Collaboration rather than a prescriptive standard rubric across all Collaborations.

Table 7. Key Collaboration Attributes

Attributes	Description
Clearly articulated and shared goals	These should be specific, measurable, attainable, relevant, and time-based (SMART) goals written and outlined prior to executing the collaboration.
Clearly defined roles and responsibilities	Collaborations must have defined roles and responsibilities across organizations to establish how the collaborations will fit into capacity, strengths, and structure of participating organizations.
Open and frequent communication	An established communication plan should be developed to reinforce knowledge sharing, accountability and transparency across collaborators.
Common measures and synthesized data	Collaborators should have agreed-upon outcome-based metrics to track progress towards shared goals, create platforms and processes to record accomplishments and accumulate data, and facilitate open access and understanding of collected data to all relevant actors.
Mutual trust, respect and shared decision-making	Collaborations should rely on mutual trust and respect between all parties involved and predicated on non-hierarchical relationships.

"I mean, I can say they've been really responsive. They've been great to work with. They've been proactive and collaborative as we've pivoted and really receptive to our input on how best to deliver the training to the school food service community."

Overall, efforts of WE&T and third-party staff demonstrate a number of these attributes. Specifically, in requiring that parties develop Statements of Collaboration, WE&T staff have created a framework to encourage collaborators to clearly articulate goals and outline organizational roles and responsibilities. Statements of Collaboration include a narrative description of goals and some detail about individual activities undertaken by each organization; however, they do not systematically key performance indicators and how those data will be tracked to support measurement of progress towards those articulated goals.

In most cases, IOUs and third parties have established open lines of communication that have proven beneficial to the development of many of the Collaborations. Additionally, in a number of cases, third-party organizations reported that WE&T Program staff at IOUs have gone beyond basic levels of communication (i.e.,

⁷ Ibid.

cursory levels of communications that do not occur on a regular basis) and become familiar with their organizations’ day-to-day needs through consistent communications that facilitate non-hierarchical relationships. This level of flexibility and interaction builds trust and mutual respect between organizations, which bodes well for longer-term engagements and navigating complex challenges (e.g., the COVID-19 pandemic). Note that different Collaborations may require more or less communication based on the organizations and individuals involved, their capacities, and their working styles and preferences.

“Well, I think having a member of SoCalGas on our advisory council is fantastic. Because she sees what’s going on and what our needs are and then she’s like, let me go check and see, if there’s something we can do to help, or where there’s shortages.”

While most Collaborations have developed a set of performance indicators related to their intended outcomes, data specific to these indicators do not appear to be tracked in any systematic or centralized way. That is, third parties and IOUs do not have an adequate means of tracking performance indicators that would enable measurement of their progress towards the intended outcomes of individual Collaborations. Further, while IOUs do have standards for data collection related to other WE&T offerings (e.g., energy center trainings, loans provided through tool lending libraries), there are not consistent practices for tracking and storing a standard set of information for individual Collaborations beyond those details captured in Statements of Collaboration. As such, data tracking processes and systems are established on an ad hoc basis and the level of detail, and the quality of information vary wildly from one Collaboration to another.

3.3 Categorizing Collaborations

The evaluation team compiled all relevant materials and reviewed any additional documents that could provide further insight into each Collaboration’s shared goals, planning structure, methods of communication, targeted audience, course focus, etc. Following our review, we defined six category types based on the intended outcomes of the 23 active Collaborations included in this study, summarized in Figure 2.

Figure 2. Collaboration Categories

Curriculum Improvement	Training Capacity	Student Awareness	Technical Training	Equipment Loans	Certifications
<ul style="list-style-type: none"> Develop and enhance training materials for education and training organizations 	<ul style="list-style-type: none"> Provide training to an organization's trainers 	<ul style="list-style-type: none"> Promote training opportunities and career awareness 	<ul style="list-style-type: none"> Offer technical training to entering or incumbent workers 	<ul style="list-style-type: none"> Loan tools and equipment via Tool Lending Libraries 	<ul style="list-style-type: none"> Support certification preparations and testing

Of the 23 active Collaborations, a majority were focused on curriculum development and enhancement for education and training organizations, as well as promoting student awareness of training opportunities and new career prospects. Others channeled their efforts towards technical training for entering and incumbent workers, preparing students for testing to earn additional certifications, training WE&T trainers, and loaning out needed tools and equipment. Table 8 outlines the number of Collaborations per type, demonstrating a fair amount of overlap among their efforts. The evaluation team developed a list of relevant performance indicators tailored to measurable impacts of those collaboration types.

Table 8. Existing WE&T Collaboration Types and Relevant Performance Indicators

Collaboration Type	Statements of Collaboration	Outputs (Key Performance Indicators)	Short-, Medium-, and Long-Term Outcomes
Curriculum Development	13	<ul style="list-style-type: none"> Number of educational institutions using materials developed Number of trainers using materials Number of topics covered by training materials (HVACR, lighting, etc.) Number of students attending trainings where materials are utilized 	<ul style="list-style-type: none"> Increased adoption of training materials by educators Increased penetration of training materials into educational organizations EE educational opportunities widely available and accessible
Student Awareness	13	<ul style="list-style-type: none"> Number of students aware of careers that have opportunities to apply EE skills Number of students considering a career that has opportunities to apply EE skills Measure of student knowledge and skills related to EE concepts Number of students applying for utility programs 	<ul style="list-style-type: none"> Increased awareness of EE career opportunities Increased attendance at technical trainings More people pursue jobs in the EE industry Increased presence of skilled EE workers, including disadvantaged workers
Technical Training	7	<ul style="list-style-type: none"> Number of technical trainings offered Number of attendees at trainings offered by Business Plan sector Number of disadvantaged worker attendees Percent of participation relative to eligible target populations 	<ul style="list-style-type: none"> Increased attendance at technical trainings Increased student knowledge and skills related to fundamental concepts, emerging technologies, best workplace practices and utility programs More people pursue jobs in the EE industry Increased presence of skilled EE workers, including disadvantaged workers
Training Capacity	5	<ul style="list-style-type: none"> Number of trainers directly trained Number of educators knowledgeable about specific EE topics available to teach courses Number of training opportunities promoted by Business Plan sector 	<ul style="list-style-type: none"> Increased adoption of training materials by educators Increased availability of educators knowledgeable about specific EE topics
Tools and Equipment Loans	4	<ul style="list-style-type: none"> Number of tools and equipment loaned Number of loan transactions Number of first-time tool and equipment borrowers Number of repeat tool and equipment borrowers 	<ul style="list-style-type: none"> Increased awareness of, familiarity with, and use of tools and equipment in projects Indirect energy savings
Certifications	3	<ul style="list-style-type: none"> Number of trainings offered Number of attendees Number of attendees who received certification upon completion of the course 	<ul style="list-style-type: none"> Increased student knowledge and skills related to fundamental concepts, emerging technologies, best workplace practices and utility programs

Collaboration Type	Statements of Collaboration	Outputs (Key Performance Indicators)	Short-, Medium-, and Long-Term Outcomes
			<ul style="list-style-type: none"><li data-bbox="1023 315 1442 399">▪ Increased presence in market of skilled workers, including disadvantaged workers

Source: Logic Models for Workforce Education & Training's "Integrated Energy Education and Training" Sub-Program Components and Linkage Explanation:
https://www.calmac.org/publications/Explanation_of_Logic_Model_Links_4.28.20_Final.pdf

4. Collaboration Case Studies

The evaluation team completed in-depth interviews with IOU staff and third-party collaborators to determine which Collaborations would be best suited for our case study approach and impact evaluation. We selected four Collaborations based on perceived availability of data and measurability of impacts. As previously mentioned, insufficient program data across all four Collaboration case studies significantly hindered the impact evaluation (Section 2.6). As such, we developed the following case studies primarily based on in-depth interviews with representatives from IOUs and third-party organizations.

In the remainder of this section, we present case studies of Collaborations between CRAF and SCE; SDCC and SDG&E; NEEC, SETA and PG&E; and IAPMO and SoCalGas.⁸ For each Collaboration, we describe the following:

- The Collaboration type and target audience;
- Whether the Collaboration meets at least one of the IOU Collaboration criteria (Section 1);
- The developmental stage of the Collaboration (Section 3.1); and
- An assessment of the key attributes of the Collaboration (Section 3.2).

As illustrated in Table 9, our team estimated that each of these Collaborations were in the early to mid-stages of development. In several cases, the COVID-19 pandemic limited further development of the Collaboration.

Table 9. Developmental Stages of Collaboration Case Studies

Collaboration	IOU	Developmental Stage
CRAF	SCE	Stabilization
San Diego City College	SDG&E	Routinization
NEEC and SETA	PG&E	Stabilization
IAPMO	SoCalGas	Routinization

4.1 Southern California Edison and the California Restaurant Association Foundation

In 2019, SCE joined forces with the CRAF to create a technical training collaboration focused on training high school students and providing them with hands-on experience using commercial food service equipment. The primary goal of these classes was for students to build upon their portfolio of skills and apply those skills in future work within the food service industry upon graduation. The trainings specifically taught students more about energy-efficient food service equipment and kitchen design to prepare students to work in commercial kitchens in the food service or hospitality industries. Partnering with CRAF allowed SCE to reach a much broader audience by leveraging existing networks of high school students and teachers, including disadvantaged individuals who otherwise would not have had the opportunity to partake in these classes.

In addition to technical training, this Collaboration incorporated a training capacity component where SCE's Food Service and Technology Center hosted a teach-the-teacher conference through their workforce development program, ProStart. The conference was intended to expand educators' cooking skills; specifically

⁸ Note that the case study describing the SoCalGas and IAPMO Collaboration is based only on in-depth interviews with SoCalGas and IAPMO staff as Opinion Dynamics received no response to our request for data to support other primary and secondary research activities.

focusing on the latest food service technologies, including convection and combination ovens, steamers, fryers, griddles and induction ranges.

Table 10 summarizes our proposed primary data collection activities, and the results of each. We conducted six in-depth interviews with teachers who participated in the Food Service and Technology Center conference and attempted to conduct student web surveys with participating students.

Table 10. SCE and CRAF Impact Evaluation Activities

Evaluation Activities	Results
Conduct student web surveys to collect feedback	<ul style="list-style-type: none"> ▪ SCE and CRAF did not track information on students that participated in the trainings.
Conduct in-depth interviews with teachers	<ul style="list-style-type: none"> ▪ Completed six interviews (out of seven total contacts provided).

The lack of student contact information prevented us from being able to perform the student web surveys. However, we learned valuable information from the in-depth interviews with teachers. The majority of teachers with whom we spoke indicated the workshops at the conference were useful, especially workshops focused on induction burners and efficient cooking equipment. Teachers also reported they were able to augment their students’ experiences by offering several of the activities from the training, specifically activities related to induction burners.

IOU Collaboration Criteria

The evaluation team found that the SCE-CRAF Collaboration worked towards meeting two key IOU collaboration criteria:

- **The Collaboration aimed to expand the reach of this WE&T opportunity to a large network of students and teachers.** CRAF was able to recruit teachers and students from a wide range of areas and backgrounds and enabled SCE to offer EE training content to students in their own high school settings. Without collecting information directly from students, we are unable to assess how often students take advantage of similar WE&T training content available through SCE’s energy center. However, this Collaboration presented an opportunity for SCE via CRAF to “meet students where they are,” which may expand access for some students, particularly those from disadvantaged communities.
- **These training activities would be difficult for each organization to provide without the assistance of the other.** For instance, SCE was finding it difficult to reach a wide network of students beyond certain localized areas. By utilizing CRAF’s connection to a large network of student communities, SCE was able to leverage that network and the existing relationships CRAF had built with different school systems. In several cases, teachers were already aware of CRAF and the ProStart materials and curriculum from previous experiences in other school systems. In those cases, CRAF was able to leverage SCE’s resources and expand into schools where educators were interested in building vocational programs focused on food service and hospitality using ProStart curricula. Further, SCE provided a venue through their energy center to offer students and teachers more hands-on and practical learning opportunities.

Stage of Development: Stabilization

While the COVID-19 pandemic posed challenges for this Collaboration, especially for the hands-on trainings that require in-person attendance, the Collaboration continued to make progress towards becoming a self-sustaining operation. Figure 3 shows the progress this Collaboration has made through the collaboration stages of development. While SCE and CRAF staff had created a set of valuable trainings and workshops for

their target audiences, at the time of this evaluation, the teams had not yet created a standard set of processes to enable the team to move into a steadier state of operation (i.e., routinization or extension).

Figure 3. SCE and CRAF Collaboration Stage of Development



Key Collaboration Attributes

In addition to meeting IOU Collaboration criteria, the evaluation team found this Collaboration met several of the key collaboration attributes, as outlined in Table 11. Both SCE and CRAF conveyed their shared goal of providing training to students from different schools and backgrounds to better prepare them upon entry into the energy workforce, specifically within the food service industry. They also clearly defined their respective roles and responsibilities: CRAF assists with recruitment and SCE provides trainings and other resources. We learned from the in-depth interviews that a sense of mutual trust and adequate communication was present among the collaborators. SCE made an initial effort to learn more about CRAF and their work, as well as observed classroom visits in various high schools. There was also biweekly contact between SCE and CRAF, via email or phone. While CRAF and SCE do collect some information about the teachers trained through the program, they did not track information over time related to the students. We do note there may be some sensitivity associated with tracking personal information for high school students and CRAF staff does track some ad hoc information about student satisfaction with their trainings and demographic information about the school systems they work within. However, these data are not consistently tracked and reported year-over year.

Table 11. SCE-CRAF Attributes of Collaboration

Attributes	Are These Attributes Identifiable and Present?
Clearly articulated and shared goals?	✓
Clearly defined roles and responsibilities?	✓
Open and frequent communication?	✓
Common measures and synthesized data?	
Mutual trust, respect and shared decision-making?	✓

4.2 SDG&E and San Diego City College

San Diego Gas and Electric and San Diego City College (SDCC) established a student awareness and certification-focused Collaboration in 2019 to provide discounted course materials and online exam codes for college students participating in a Building Science Principles (BSP) course. Prior to the formation of this Collaboration, SDCC staff were both aware of and had previously taken advantage of SDG&E’s WE&T offerings—for example, professors had participated in train-the-trainer events and regularly referred students to trainings at the Energy Innovation Center. For this Collaboration, SDG&E built upon an existing relationship to establish a more formal offering for SDCC students specifically aimed at increasing access to a valuable industry certification for students who were serious about careers in building sciences and the energy industry more broadly. SDG&E committed to provide SDCC students with a paperback version of the BPI BSP reference guide, access to the BSP exams for free,⁹ and ad hoc support to the course instructor(s) (e.g., making instructors aware of any additional upcoming trainings available through the Energy Innovation Center). Together, collaborators aimed to reach as many students as possible to increase the accessibility of preparing for and obtaining a BSP certification at a greatly reduced cost and expanding the reach of SDG&E training efforts and opportunities. In total, 30 unique students received the free BSP materials between February and October of 2020.

" The whole idea was to try and figure out how to get the students to industry recognized certifications at no cost to the student as quickly as possible... I think it's a great resource for the students to take advantage of as many times as they can."

Table 12 summarizes the primary impact evaluation activities conducted as part of this case study. We reviewed all materials provided, conducted a web survey for participating students, and attempted a review of program tracking data.

Table 12. SDG&E and SDCC Initial Impact Evaluation Activities

Evaluation Activities	Result
Review of collaboration materials	<ul style="list-style-type: none"> Reviewed the BSP reference guide and used it to develop a survey instrument for participating students
Web survey with participating SDCC students	<ul style="list-style-type: none"> Created a survey instrument to collect student feedback roughly one year post participation to assess career trajectory, among other outcomes. Out of 30 total participants who received the BSP manual and test code, only one completed the survey.
Program tracking data review	<ul style="list-style-type: none"> Could not identify participating SDCC students who had taken advantage of other WE&T training offerings

As summarized above, only one participating SDCC student fully completed the web survey for this evaluation and seven participants partially completed the survey. We also reviewed SDG&E training event data from 2020 through the first quarter of 2021 and found two instances where participants from this Collaboration (30 total) also participated in an SDG&E energy center training.

IOU Collaboration Criteria

We found the SDG&E–SDCC Collaboration worked to satisfy two key IOU collaboration criteria:

⁹ The Building Performance Institute offers a the BSP Certificate of Knowledge to home improvement contractors aimed at encouraging energy efficiency and sustainable building practices. <https://www.bpi.org/certificate>

- **The entire purpose of this Collaboration was to expand access to materials and an industry certification to students considering a career in the energy industry.** This was done by providing free access to BSP training materials and exam codes to allow students interested in EE careers to obtain the certification.
- **The Collaboration also relied on leveraging the strengths of both organizations to serve students seeking to enter the energy workforce.** By forming this Collaboration, SDCC was able to offer their students a deeply discounted opportunity to obtain a BSP certification. Additionally, SDG&E provided an incentive to help more students interested in building science and EE take advantage of SDCC's existing curriculum and expertise.

Stage of Development: Routinization

At the time of this evaluation, the Collaboration had developed a set of standard processes that had allowed for some routinization, shown in Figure 4, which has allowed both parties to fine-tune rules and guidance for continued engagements. This Collaboration matured quickly due to a previous relationship between the two organizations. An instructor at SDCC had ties to SDG&E through its Energy Innovation Center, which had served as an additional resource for students over the years. Through this Collaboration, SDG&E's goal was to reach students interested in EE and building science careers directly and provide some benefit in the form of free BSP training materials and exam codes.

Figure 4. SDG&E and SDCC Collaboration Stage of Development



Key Collaboration Attributes

Table 13 outlines the key attributes of the SDG&E–SDCC Collaboration identified through this case study. As mentioned, this Collaboration had a clearly articulated and shared set of goals between collaborators, including the extension of educational and certification opportunities to students interested in energy-related careers. The way in which these opportunities were passed on to students was simple, creating clearly defined set of roles and responsibilities for each collaborator. SDG&E was responsible for providing discounted BSP exam codes, a paperback copy of the BPI BSP manual, and additional trainings of interest, while the instructor(s) at SDCC was tasked with referring students to those offerings and programs. Communication between the two parties occurred at least once every eight weeks, with follow-up coordination as needed in the interim. Both staff at SDG&E and SDCC reported high levels of trust and respect for the other organization, fostered by routine communication and years of information collaboration between both parties. In terms of data collection and synthesis, SDCC and SDG&E had a set process for tracking basic information on the students that received the exam codes. We note that SDCC may track additional information on these students for their own purposes (e.g., student career paths, satisfaction with individual classes, etc.), though these data are not linked to data provided to SDG&E related to this specific Collaboration.

Table 13. SDG&E–SDCC Attributes of Collaboration

Attributes	Are These Attributes Identifiable and Present?
Clearly articulated and shared goals?	✓
Clearly defined roles and responsibilities?	✓
Open and frequent communication?	✓
Common measures and synthesized data?	✓
Mutual trust, respect and shared decision-making?	✓

4.3 PG&E, Northeast Energy Efficiency Council and the Sacramento Education and Training Agency

PG&E and the NEEC worked together on a technical training and certification-focused Collaboration with the SETA to offer disadvantaged workers the opportunity to participate in BOC trainings. Through this Collaboration, PG&E facilitated eight days of BOC training for up to seven qualified candidates, specifically disadvantaged workers recruited and approved by SETA and NEEC. The main objective of this training was to help these individuals enter the EE workforce. NEEC served as the primary implementer of this BOC training program, including creating marketing and outreach materials, approving candidates, initiating the training, and providing the certification to participants. SETA aided with recruitment in PG&E’s service territory by leveraging their network of local workforce development boards, while PG&E provided overall financial and administrative support, along with technical assistance related to BOC and training best practices.

"We saw BOC as an opportunity to train up and provide skills and knowledge to disadvantaged workers and contribute to PG&E's goals in that territory ...but really it comes down to diversifying the student pool in BOC and helping fill the gap in the incoming worker pipeline for employers."

Table 14 summarizes the primary evaluation activities we attempted to conduct as part of this case study. We reviewed all pertinent Collaboration materials, including the BOC training test booklets, workbooks, and course evaluation summaries. We also attempted to conduct in-depth interviews with BOC program participants and their employers.

Table 14. PG&E, NEEC and SETA Impact Evaluation Activities

Evaluation Activities	Results
In-depth interviews with BOC program participants	<ul style="list-style-type: none"> Eleven participants could not be reached after five rounds of outreach, along with additional assistance with outreach provided by program staff, no interviews conducted
Review of NEEC BOC training materials	<ul style="list-style-type: none"> Reviewed test booklets, collaboration brief, BOC Level I project workbook, course evaluation summaries and student participating results
In-depth Interviews with BOC Participant Employers	<ul style="list-style-type: none"> Completed no interviews with participants and program staff did not collect employer information

Despite several rounds of outreach and assistance from collaborators, the evaluation team could not reach BOC program participants to conduct in-depth interviews. We also could not complete interviews with participant employers as collaborators did not collect this information and, as we received no response from participants, we were unable to obtain employer contact information directly from participants.

Additional detail from

IOU Collaboration Criteria

The PG&E, NEEC and SETA Collaboration strived to fulfill all three IOU Collaboration criteria:

- **First, the efforts by each collaborator worked to expand the reach of WE&T to disadvantaged workers in PG&E service territory.** PG&E sought to build upon the expertise and existing networks of NEEC and SETA to find ways to offer BOC trainings to disadvantaged communities that they have, otherwise, been unable to reach for this program.
- **Each collaborator provided resources and services to the Collaboration in order to reach the target population.** NEEC and SETA provided recruitment, training, and certification services to assist PG&E in reaching workers in their territory, while PG&E provided overall oversight and support.
- **The organizations provided these resources and services to the energy workforce that the others would not be able to achieve in the absence of assistance.** With the administrative help of PG&E, NEEC provided all the essential components of the training while SETA recruited the target participants meant to complete the training.

Developmental Criteria

SETA and NEEC had experience working with PG&E prior to the formation of this Collaboration between 2018 and 2019, and were able to quickly establish trust and norms for day-to-day operation. At the time of this evaluation, the Collaboration recruited and trained its first cohort of participants and had begun to “stabilize”—that is, goals, roles and responsibilities, and objectives for the Collaboration had been set, shown in Figure 5. Due in part to the interruption in the ability to provide in-person trainings during the COVID-19 pandemic; however, the Collaboration had not yet entered the “routinization” stage where collaborators have developed a set of routine tools or processes or established any sort of pipeline of participants for future trainings.

Figure 5. PG&E, NEEC, and SETA Collaboration Stage of Development



Key Collaboration Attributes

Table 15 outlines the key attributes identified through this case study of the PG&E, NEEC and SETA Collaboration. The shared goal among all collaborators was to extend the BOC training and certification to disadvantaged workers to provide them career pathways into the EE workforce. Each collaborator had defined roles and responsibilities for their contributions to the Collaboration. As previously discussed, NEEC was responsible for creating outreach and marketing materials, kickstarting trainings, interviewing and approving qualified candidates and certifying workers who successfully completed the course, while SETA was responsible for recruiting potential participants and submitting their applications to NEEC for approval. PG&E offered administrative and financial support, funding and managing the Collaboration throughout its duration.

Communication between PG&E and NEEC occurred at least once a month, with weekly meetings occurring during pivotal deadline periods like outreach and training launches. SETA and NEEC communicated at least every two weeks throughout the duration of the training program. While communication occurred frequently, staff from SETA mentioned wanting PG&E to be bit more “hands-on in the process” and allow for adequate time in between communications to accomplish certain tasks.

The collaborators tracked registration information for participants, along with various other pieces of information about performance and student employment outcomes. Specifically, collaborators tracked information on participant satisfaction, along with performance on tests designed to measure participants’ knowledge of the course content. SETA also tracked qualitative information on participants’ perception of the training and their employment situations where available. NEEC representatives discussed various performance metrics they used to evaluate the success of the program, including registration goals, the number of participants who enrolled, and the number who received their certificates.

Table 15. PG&E, NEEC and SETA Attributes of Collaboration

Attributes	Are These Attributes Clearly Identifiable and Present?
Clearly articulated and shared goals?	✓
Clearly defined roles and responsibilities?	✓
Open and frequent communication?	✓
Common measures and synthesized data?	✓
Mutual trust, respect and shared decision-making?	✓

4.4 SoCalGas and the International Association of Plumbing and Mechanical Officials

SoCalGas formed a Collaboration with IAPMO to create a technical training and certification program, Natural Gas Foodservice Equipment Installer Training and Certification. The intended outcome of the collaboration was to educate and certify contractors, technicians, facility managers and others in the commercial food service industry to adequately install equipment in commercial food service kitchens, including but not limited to natural gas piping, safety and troubleshooting measures, water heating systems, grease and drainage systems, and electronic controls for natural gas. The program was primarily geared towards helping beginners who were either working in the commercial food service industry and were installing food service equipment or were looking to improve their skills and grow their careers. IAPMO designed, created, and delivered the training course while SoCalGas provided key resources like a proper teaching location with access to

commercial kitchen equipment, access to their computer lab for attendees to take their certification exams, and assistance with outreach and promotion of the class to industry professionals.

Table 16 summarizes the primary impact evaluation activities we conducted as part of this case study. We developed the remainder of this case study based on a limited set of interviews with SoCalGas and IAPMO staff. We requested additional data to support this evaluation; however, SoCalGas did not respond to several requests for additional data to support our analyses.¹⁰

Table 16. SoCalGas and IAPMO Impact Evaluation Activities

Proposed Evaluation Activity	Result
Review course materials and interviews with IAPMO training staff	<ul style="list-style-type: none"> ▪ Review could not be completed, requested data was never received
Conduct in-depth interviews with course participants	<ul style="list-style-type: none"> ▪ Could not conduct in-depth interviews, contact information was never received

IOU Collaboration Criteria

As the evaluation team was unable to complete either of the evaluation activities identified above, we are unable to present findings related to if and how the SoCalGas–IAPMO Collaboration met any of the three IOU Collaboration criteria. However, based on interviews with staff at SoCalGas and IAPMO that both organizations strive to meet the following two IOU Collaboration criteria:

- **Through the Collaboration, both organizations work towards providing resources tailored to the specific needs of those working with or managing natural gas food service equipment.** The collaborators developed and disseminated outreach and course materials to facility managers in commercial real estate, contractors who install food service equipment, restaurant workers and others.
- **Both organizations endeavor to achieve together, what would be less feasible alone.** By leveraging IAPMO’s network and technical expertise, SoCalGas was able to support the development of a specialized training and certification program aimed at those working with natural gas commercial food service equipment.

Stage of Development: Routinization

According to staff at both organizations, IAPMO and SoCalGas have developed a strong working relationship and a standard set of routine processes through this Collaboration (Figure 6). Both organizations reported that the teams are organized and have developed a set of norms governing how they work together and already have some established legitimacy with their target audiences. This assessment does not include any review of course materials or information on the number of students reached through their training efforts as SoCalGas was unable to provide any supporting information.

¹⁰ Opinion Dynamics and the CPUC each made several attempts to request the supporting information from SoCalGas and IAPMO between April and August of 2021. In consultation with the CPUC, Opinion Dynamics decided to move forward with the evaluation without receiving supporting information related to this Collaboration.

Figure 6. SoCalGas and IAPMO Collaboration Stage of Development



Key Collaboration Attributes

" The relationship is pretty open and collaborative...it's kind of a symbiotic relationship – neither one of us succeed without the other."

Table 17 outlines the key attributes identified through this case study of the SoCalGas–IAPMO Collaboration. As previously discussed, this Collaboration set out to enhance the energy workforce, improve installation practices of food service equipment, and fulfill IOU goals of expanding the reach of WE&T initiatives. In terms of roles and responsibilities, SoCalGas served a significant support and guidance role and was responsible for providing assistance with marketing and outreach, as well as providing the learning spaces for IAPMO to conduct its training and examinations. IAPMO served as the main training and certification implementer—designing and delivering the course to participants.

Throughout the process, collaborators described that communication occurring on an ad hoc basis was adequate to allow each collaborator to fulfill their responsibilities, which also helped to provide a clear sense of shared decision-making and trust. IAPMO provided SoCalGas with written reports on the trainings at mid-points and at the end of each semester at times when there was less frequent verbal communication between collaborators (e.g., during periods when IAPMO staff were actually delivering trainings to participants). These reports provided SoCalGas with updates related to course implementation and performance, including exam scores and distribution curves, as well as the number of participants who enrolled and completed the trainings. While collaborators noted that data were shared between organizations, none of these data were made available to the evaluation team. Consequently, we are only able to provide a somewhat limited assessment of data tracking procedures and were unable to carry out any of our intended impact evaluation activities.

Table 17. SoCalGas–IAPMO Attributes of Collaboration

Attributes	Are These Attributes Clearly Identifiable and Present?
Clearly articulated and shared goals?	✓
Clearly defined roles and responsibilities?	✓
Open and frequent communication?	✓
Common measures and synthesized data? ^a	
Mutual trust, respect, and shared decision-making?	✓

^a Collaborators reported data were tracked and shared among organizations; however, none of these data were made available to the evaluation team and, therefore, we were unable to verify.

5. Findings and Recommendations

In this section, we detail key findings and associated recommendations for future WE&T Collaborations between IOUs and third-party organizations.

- **Finding 1:** Based on our qualitative research, Collaborations aim to meaningfully contribute to the WE&T Program and do so on an ad hoc basis. In most cases, Collaborations worked towards satisfying the base level requirements for WE&T Collaborations (see Section 1). However, due to very limited data collected by IOUs and third parties, the evaluation team is unable to make assessments as to whether Collaborations included in this report meet those base requirements. In all four case studies included in this evaluation, Collaborations attempted to expand the reach of the WE&T Program in a meaningful way. While it was clear from interviews with representatives of these four Collaborations, that their goal was to achieve more than any single organization could on their own, due to data limitations, we are unable to validate this assertion. Additionally, all four Collaborations included as case studies in this evaluation satisfied the key attributes of successful collaborations (see Section 3.2), except for having common measures and synthesized data.
- **Finding 2:** Statements of Collaboration create a framework to encourage collaborators to clearly articulate goals and outline organizational roles and responsibilities. Most include: a narrative description of the Collaboration’s goals, a list of what each organization involved will do in support of the Collaboration, and a list of individuals involved from each organization. While these statements capture some basic information, they could be augmented to document information in a more systematic and detailed way that would aid in the development of new Collaborations.
 - **Recommendation:** Statements of Collaboration should include detailed data collection and sharing plans as mentioned previously. Further, these documents should specify key performance indicators separately. While at present, some statements include this information in the narrative description of what each organization is responsible for, we recommend creating a separate field that ties each activity within a Collaboration to performance indicators, identifies which organization is responsible for tracking those data, and documenting other relevant details. For example, collaborators may agree to conduct anonymized pre- and post-participation surveys with those that received training through a Collaboration to serve as a key performance indicator. This type of data collection and reporting may be particularly useful where collecting and storing personal information is not feasible (see SCE and CRAF case study in Section 4.1). This type of specific documentation will greatly improve decision makers’ ability to assess progress towards intended outcomes. Table 18 provides an example of a systematic means of tracking these details in each Statement of Collaboration.

Table 18. Example Activity Documentation for Statement of Collaboration

Example Variable	Activity	Third-Party Responsible	Description	Time Period (i.e., start and end dates)	Key Performance Indicator	Reporting and Tracking
Description	Specific deliverable or activity undertaken as part of the Collaboration	Organization responsible for activity or deliverable	Narrative description of activity or deliverable	Period when activity or deliverable is expected to start and end	Metric agreed upon by collaborators to track progress of activity or deliverable	Method for tracking performance metric

- **Recommendation:** Statements of Collaboration should also clearly specify Collaboration type along with the desired outcome for ease of understanding the entire landscape of current and past WE&T Collaborations. Based on our review of current Collaborations, we identified six key Collaboration types based on their desired outcomes; those focused on curriculum development, building student awareness, technical training, building training capacity, providing tool or equipment loans, and helping students acquire certifications (see Section 3.3). We note that this list of Collaboration types may not be exhaustive, and IOUs may elect to expand upon the types of Collaborations in the future. Further, IOUs should work closely with third parties as they establish Collaborations to document the types of key performance indicators or outputs that most clearly demonstrate progress towards their desired outcomes (we list outputs associated with each Collaboration type in Table 8 below). This type of strategic exercise completed when IOUs and/or third parties initiate a Collaboration can help decision makers plan and support appropriate data collection to measure progress towards desired outcomes and continuously improve offerings.
- **Finding 3:** While many Collaborations track information related to participants and key performance indicators, data tracking is not uniform across all Collaborations; and, in a number of cases, collaborators do not collect adequate data to enable any assessment of progress towards their intended outcomes. Third-party collaborators have a range of capabilities when it comes to tracking and sharing data—that is, some organizations may have the resources to purchase and maintain data collection and storage software or infrastructure while others do not. As such, some third-party Collaborators may require more support from IOUs to be able to track and report on key performance indicators.
 - **Recommendation:** When initiating Collaborations, WE&T staff at IOUs should clearly specify data tracking and sharing processes and procedures. Processes should also be specified in Statements of Collaboration, along with other information already included in those documents. WE&T staff should also explore additional sources of data that third parties may be amendable to sharing (i.e., data that may be collected outside of the formal Collaboration) that could help support the Collaboration directly or indirectly through evaluation. For example, our team learned that SDCC may track additional information related to career paths, satisfaction, and other dimensions for students who received free BSP manuals and exam codes; however, it is unclear if SDG&E incorporates these data into their program tracking database related to Collaborations (see Section 4.2). In other cases, IOUs should provide support for third parties to enable adequate data tracking and sharing to support the Collaboration.
 - **Recommendation:** Collaborations of the nature facilitated by IOUs see results of their work over longer periods of time and, as such, IOUs should consider supplemental data collection (i.e., in addition to data collected by individual collaborators) to aid in assessing both the quality and functioning of Collaborations, but also their impacts. WE&T Program staff at IOUs should consider periodic surveys with staff at third parties, or another systematic way of documenting “lessons learned,” to build a broader understanding of what works well and where WE&T staff may have room to improve Collaborations. In most cases, the WE&T Program engages with third-party organizations for the purpose of reaching communities or populations with whom those organizations have established trust. Decision makers at IOUs can leverage this expertise in a more systematic way by creating a venue for representative of these organizations to provide succinct and targeted feedback.
- **Finding 4:** CPUC’s WE&T Program is multi-faceted, involving many actors, types of collaborations, and target populations. It is clear that the WE&T IEET Program, while at its core is dedicated to growing and expanding the EE workforce through education and training, has many unique collaborative relationships under its scope. It is a program that continues to expand and recruit new actors while also working to maintain and manage its current Collaborations and collaborators.

- **Recommendation:** Prioritizing Collaborations that involve actors who are willing and able to take a systematic approach to the development, design, and implementation of Collaborations will limit program management challenges, yield long-lasting outcomes for the WE&T Program, and allow future evaluation teams to easily execute assessment activities.
- **Finding 5:** The criteria for what constitutes a Collaboration developed by IOUs (see Section 1) primarily focus on the types of activities that Collaborations will aim to achieve. As such, they do not provide much value in helping IOUs think strategically about what outcomes each Collaboration aims to achieve and whether Collaborations will ultimately be of the most value when it comes to serving specific targeted groups in new and different ways. Further, these criteria largely focus Collaborations on granting more access to individuals and groups of people that are otherwise unable to take advantage of WE&T programming. However, it is unclear what groups of people do and do not currently have access and, as such, difficult for stakeholders to understand if and how Collaborations that satisfy the current criteria enable WE&T to serve people outside of those they currently serve.
- **Recommendation:** As these criteria are largely focused on developing new offerings to target populations outside of those that currently have access to WE&T offerings, we recommend that future research related to these Collaborations, or WE&T more broadly, focus on identifying the baselines for number of people and the types of populations currently served through WE&T programs and that these Collaborations aim to serve. This type of research would enable IOUs and stakeholders to have a starting point from which to both identify which Collaborations may be of most strategic benefit and measure the relative success of individual Collaborations. Further, this sort of exercise can help decision makers be more strategic about which Collaborations may be most beneficial to help achieve medium- or long-term goals. For example, establishing quality baselines can help IOUs understand which populations they may be underserving or which outcomes (see Table 8) need more support through initiating Collaborations.
- **Recommendation:** We recommend that IOUs reframe their Collaboration criteria to be more focused on the types of outcomes that Collaborations aim to achieve (see Table 8). That is, Collaborations should be focused on achieving one or more of the short- medium- or long-term outcomes specified in the program theory and logic model for the Integrated Energy Education and Training sub-program.¹¹

¹¹ Opinion Dynamics. (2020). *Logic Models for Workforce Education & Training's "Integrated Energy Education and Training" Sub-Program Components and Linkage Explanation*: https://www.calmac.org/publications/Explanation_of_Logic_Model_Links_4.28.20_Final.pdf

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