

WE&T K–12 Career Connections: Energy is Everything Program Theory Logic Model (PTLM) and Evaluability Assessment Memorandum

To: Siria Salas, The Energy Coalition; Andrea Porter, PG&E; Robert Marcial, PG&E; Jordan Christenson, CPUC
From: Samantha Lamos, Ellen Steiner; Opinion Dynamics
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Re: Program Theory Logic Model and Evaluability Assessment Findings

Introduction

The WE&T Program vision, set forth by the California Long Term Energy Efficiency Strategic Plan (CLTEESP), is to provide the human capital necessary to achieve California's economic energy efficiency and demand-side management potential.¹ In the California Independently Owned Utilities' (IOUs') 2018–2025 energy efficiency business plans, IOUs continued to focus on collaborations with third-party entities as a key WE&T cross-cutting strategy for meeting the state's ambitious energy goals. The WE&T program portfolio includes three sub-programs: Career Connections, Career & Workforce Readiness (CWR), and Integrated Energy Education & Training (IEET). The California Public Utilities Commission (CPUC) has tasked Opinion Dynamics with assessing the evaluability of the new third-party Energy is Everything (EisE) program which is part of the Career Connections sub-program.

The purpose of this program theory logic model (PTLM) development and subsequent evaluability assessment is to examine the extent to which the program theory of the EisE program can be evaluated reliably and credibly. There are two main considerations in conducting an evaluability assessment: plausibility and feasibility. Therefore, the goal of this memorandum is to address the following two questions:

- **Is it plausible to expect intended outcomes?** Are there logical connections between activities and intended short-, mid- and long-term outcomes?
- **Is it feasible to assess or measure the intended outcomes?** Is it possible to measure the intended outcomes, given the collected data and resources available?

In the remainder of this memorandum, we review background information to provide context, outline the PTLM behind the EisE program and explain connections between activities and short-, medium- and long- term outcomes, and then discuss the key findings from our evaluability assessment.

¹ California Long Term Energy Efficiency Strategic Plan, January 2011 Update, Engage 360, p. 7

Background

EisE is a non-resource training program that aims to build a pipeline of qualified energy workers by creating pathways for energy education for K–12 students particularly in disadvantaged communities (DACs). The program partners with district offices, county offices of education, education resource centers, science and environmental education networks, community colleges, universities, and community based organization (CBO) partners to recruit implementation partners into the program including Energy Educators, Field Educators, and Energy Fellows. Key activities of EisE includes developing energy related curricula, offering “train the trainer” workshops in person and online, and developing key partnerships with community partners and local education providers to promote the program and recruit educators.

The EisE program conducts an analysis of local areas to determine which schools and other education providers² to target with program offerings based on program criteria for disadvantaged education providers.³ After education providers are identified, the program works with these organizations to recruit formal or informal educators to become Energy Educators in the program.

The program will build off The Energy Coalition’s (TEC) existing network of Energy Fellows, Field Educators, and other stakeholders to form a network of local education providers and partners to support program implementation. EisE partners with college-aged students and adults looking to gain on the job training, fieldwork hours, or who are new to the field, and train them in energy related topics to become Field Educators. The program also recruits Energy Fellows from Climate Corp AmeriCorps (CCAC) and various other program partners who will coordinate with the implementer, The Energy Coalition, to support program implementation. Energy Fellows gain on-the-job training, workforce training, and skills development while enriching EisE offerings.

The program has developed modular lessons that may be integrated into existing curriculum by formal or informal educators.⁴ These lessons introduce energy concepts including integrated demand side management (IDSM), energy efficiency (EE), demand response (DR), and information about energy career pathways into existing K–12 curriculum.

Early Evaluation Activities

Prior to conducting this evaluability assessment, Opinion Dynamics conducted the following early evaluation activities that provided the foundation for this evaluability assessment:

- Conducted in-depth interviews with Career Connections Program Staff at Pacific Gas and Electric (PG&E), the EisE Program Administrator
- Conducted in-depth interviews with EisE Implementation Staff at TEC

² Other education providers could include after-school programs, community centers, clubs, or other education-related organizations.

³ The EisE program defines an education provider as being “disadvantaged” if they meet one of the following criteria: They are classified as Title 1; they are classified as Free and Reduced-Price Meal (FRPM) above 40%; they are located in a zip code scoring in the top 25% of statewide per CalEnvironScreen 3.0; or they are classified as rural (*Energy is Everything Program Manual*).

⁴ A formal educator is defined by the program as being a credentialed teacher providing instruction to students in a formal classroom setting while informal educators are defined as an educator providing before/after school, outdoor, environmental, or camp-style instruction in a non-classroom setting.

- Reviewed available data and materials related to program theory, program design, and implementation

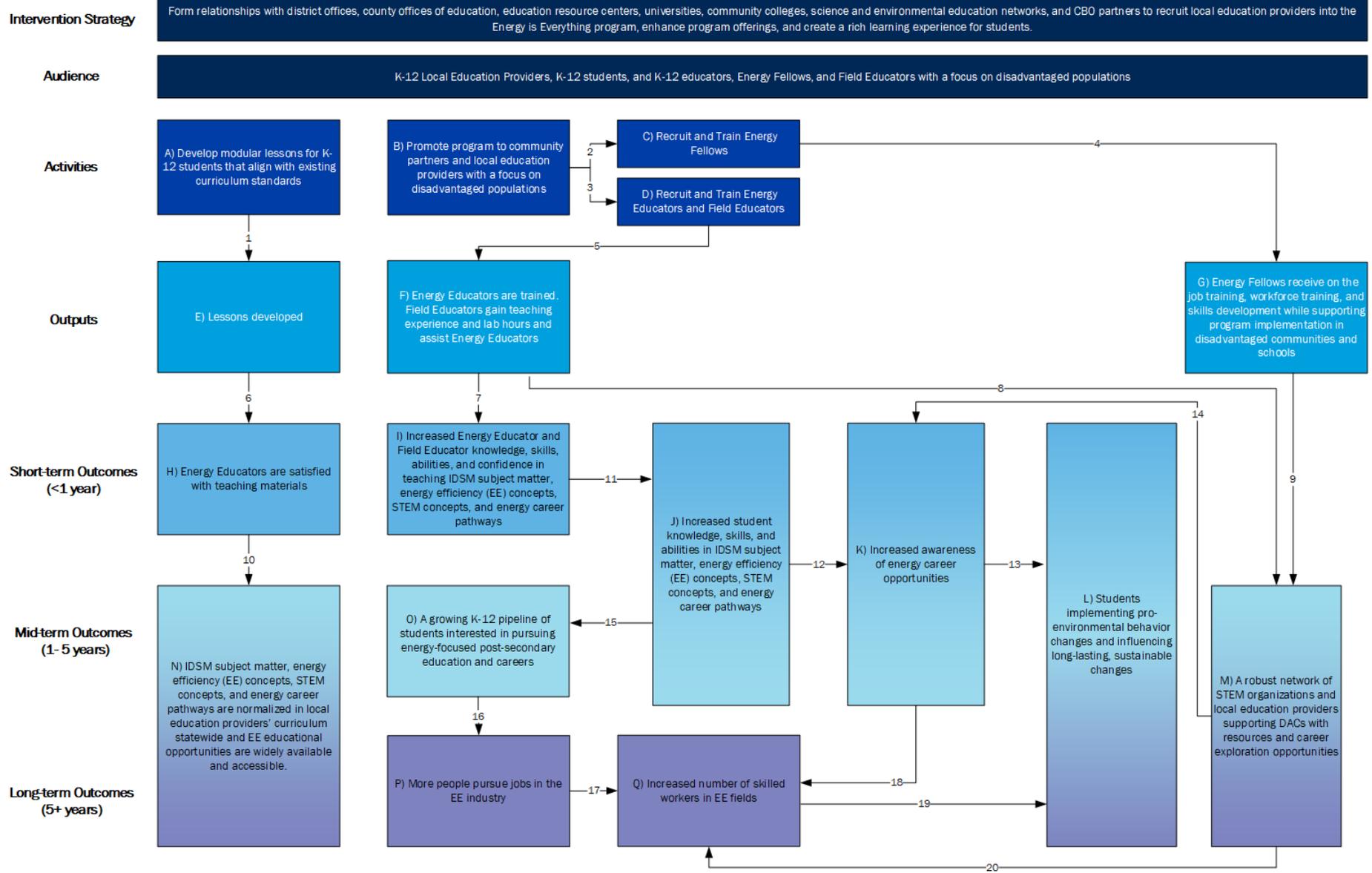
Is it plausible to expect intended outcomes?

Opinion Dynamics completed a review of all available program data related to program theory, program design, and implementation including implementation plans, program descriptions, key performance indicators, data collection methods, and existing process models. We received all relevant information from the implementer, TEC, and PG&E program staff. This data included a draft of the Program Implementation Plan, a draft of the Program Manual, and the IOU Business plan. The Program Implementation Plan included specific key performance indicators (KPIs), goals, intended outcomes of the program, implementation timelines, and existing PTLMs. The Program Manual included program roles and responsibilities for PG&E staff, TEC staff, and various program partners. The Program Manual also outlined program eligibility requirements, program delivery processes for each phase of implementation, and specific quantifiable outcomes for each year of implementation from 2021 to 2024.

Opinion Dynamics began the PTLM development process by creating an initial PTLM that captured the core theory behind the EisE program including its key activities, outputs of activities, and intended short-, mid-, and long-term outcomes. This initial PTLM was informed by program staff interviews with the implementation team from TEC and PG&E EisE Program Staff, and a program material review noted above. We presented the initial PTLM to PG&E and TEC program staff and solicited feedback about the accuracy of each element and asked for recommendations for additional activities, outputs, and outcomes that should be added to the PTLM. We then met once again to discuss changes to the PTLM and to come to a consensus regarding specific program activities, outcomes, and goals.

The PTLM activities are listed from left to right and the outcome categories are listed in chronological order from top to bottom. The PTLM features arrows labeled with numbers and these arrows represent linkages. Below, we briefly explain each intervention strategy and the links in each logic model.

Figure 1. Career Connections: Energy Is Everything Logic Model



This section expands on the program theory that supports the EisE program. The KPIs listed in Table 1 are current and potential metrics that could be measured during program implementation to track the progress of each activity and subsequent linkage listed in the PTLM. The KPIs will help to illuminate the linkages as well as support future WE&T Program evaluations. The KPIs tied to outcomes will likely require additional studies to collect the necessary information. We do not suggest that information for every listed KPI be collected and measured. Instead, we recommend that CPUC, PG&E, the implementer, and the evaluator(s) discuss which links need investigation at the outset of an evaluation of the EisE program, based on how the program unfolded and operated in that year.

Table 1 below shows how the activities, outputs, and short-, medium-, and long-term outcomes in each component of the PTLM are interconnected. The table is organized by the link numbers. The KPIs are color coded with black denoting metrics that are already planned to be tracked, and green represents KPI information that is not currently integrated, but we would recommend including.

Table 1. Explanation of Links in Career Connections: Energy is Everything Logic Model

| Link | Segment Theory | Potential or Existing Key Performance Indicator for Future Consideration |
|------|--|--|
| 1 | The output of the activity develops modular lessons for K–12 students that align with existing curriculum standards (A) is lessons developed (E) . The implementer, TEC, develops materials to provide to educators. Then educators provide feedback based on their experience teaching the materials and student feedback from post-learning surveys. TEC adjusts materials as necessary. | <ul style="list-style-type: none"> • Teacher and student satisfaction with teaching materials and lessons • Verified student instruction & training hours • Number of energy educators that received and utilized educational resources |
| 2 | The extension of the activity promote program to community partners and local education providers with a focus on disadvantaged populations (B) is Recruit and Train Energy Fellows (C) . TEC works with Climate Corp AmeriCorps (CCAC) to recruit and train Energy Fellows to support program implementation. | <ul style="list-style-type: none"> • Number of recruited Energy Fellows |
| 3 | The extension of the activity promote program to community partners and local education providers with a focus on disadvantaged populations (B) is Recruit and Train Energy Educators and Field Educators (D) . TEC conducts an analysis of local areas to determine which schools and other education providers to target with program offerings based on program criteria for disadvantaged education providers. TEC then recruits Energy Educators through direct marketing and relationships with schools and local training providers. Trainings are oriented to credentialed teachers who teach in traditional classroom settings as well as informal educators who teach in non-classroom settings such as before/after school programs, camps, and other educational organizations. Field Educators are student teachers who are recruited through partnerships with colleges and universities. The program remains cost-effective by utilizing Field Educators to support program activities. | <ul style="list-style-type: none"> • Number of trainings offered • Number of Energy Educator attendees at trainings • Number of unique Energy Educator attendees • Educator knowledge and skill gain |

| Link | Segment Theory | Potential or Existing Key Performance Indicator for Future Consideration |
|------|--|---|
| 4 | An output of Recruit and Train Energy Fellows (C) is Energy Fellows receive on the job training, workforce training, and skills development while supporting program implementation in disadvantaged communities and schools (G) . CCAC recruits and trains climate leaders in AmeriCorps to act as program advocates in geographically isolated disadvantaged communities. | <ul style="list-style-type: none"> • Number of trained Energy Fellows • Number of disadvantaged local education providers served |
| 5 | The output of train Energy Educators, Energy Fellows, and Field Educators (D) is Energy Educators are trained. Field Educators gain teaching experience and lab hours and assist Energy Educators. Energy Fellows receive on the job training, workforce training, and skills development while enhancing EisE offerings in disadvantaged communities and schools (F) . Formal and informal Energy Educators are trained to provide lessons in STEM, energy efficiency (EE) concepts, IDSM subject matter to K-12 students. Field Educators are trained to conduct Lab Day lessons in classrooms and support field and hands on learning activities. | <ul style="list-style-type: none"> • Educator knowledge and skill gain • Number of Energy Educators enrolled • Number of local education providers served • Number of disadvantaged local education providers served • Number of formal local education providers served • Number of partnerships established |
| 6 | Lessons developed (E) leads in the short-term to Energy Educators are satisfied with teaching materials (G) . Educators first administer a pre-teaching survey and a Kickoff lesson to introduce students to Student Energy ACTIONS. After completing each lesson, Energy Educators complete a Lesson Reflection and Feedback form to provide feedback to the program. The program will adjust teaching materials based on educator feedback. Oriented towards Energy Educators. | <ul style="list-style-type: none"> • Number of energy educators that received and utilized educational resources • Educator knowledge and skill gain • Program satisfaction |
| 7 | Energy Educators are trained. Field Educators gain teaching experience and lab hours and assist Energy Educators (F) leads in the short term to increased Energy Educator knowledge, skills, abilities, and confidence in teaching STEM, energy efficiency (EE) concepts, IDSM subject matter, and energy career pathways (I) Oriented towards formal and informal teachers and Field Educators. | <ul style="list-style-type: none"> • Educator knowledge and skill gain • Number of students enrolled • Number of verified student instruction and training hours • Student knowledge gain |
| 8,9 | A mid- and long-term outcome of Energy Educators are trained. Field Educators gain teaching experience and lab hours and assist Energy Educators (F) and Energy Fellows receive on the job training, workforce training, and skills development while supporting program implementation in disadvantaged communities and schools (G) is a robust network of STEM organizations and local education providers supporting DACs with resources and career exploration opportunities (L) . TEC has | <ul style="list-style-type: none"> • Number of local education providers served • Number of disadvantaged local education providers served • Number of partnerships established • Number of energy educators that received and utilized educational resources |

| Link | Segment Theory | Potential or Existing Key Performance Indicator for Future Consideration |
|------|---|---|
| | <p>already established a significant network of education providers including Energy Educators, Field Educators, and Energy Fellows who all work to support program implementation. Through listed program activities, TEC will continue to build on this network to engage additional DACs. Energy Fellows are strategically placed in isolated disadvantaged communities to grow the network of communities involved in the program. This part of the program is focused on program engagement with DACs in conjunction with community partners such as CCAC.</p> | |
| 10 | <p>The mid- and long-term outcome of Energy Educators are satisfied with teaching materials. (H) is STEM, energy efficiency (EE) concepts, IDSM subject matter and career pathway lessons are normalized in local education providers' curriculum statewide, and EE educational opportunities are widely available and accessible (N). As program materials are increasingly introduced to educators, more and more EE concepts will be integrated into curriculums. Increased penetration of EE concepts into schools will lead to increased availability of other learning opportunities related to energy or sustainability. Oriented towards formal and informal education providers.</p> | <ul style="list-style-type: none"> • Educator knowledge and skill gain • Increased access to EE educational opportunities • Number of energy educators that received and utilized educational resources |
| 11 | <p>Increased Energy Educator and Field Educator knowledge, skills, abilities, and confidence in teaching STEM, energy efficiency (EE) concepts, IDSM subject matter, and energy career pathways (I) leads in the short and mid-term to Increased student knowledge, skills, and abilities in STEM, energy efficiency (EE) concepts, IDSM subject matter, and energy career pathways (J). As educators are effectively trained and begin to provide lessons to students, students will begin to gain more familiarity and knowledge with EE concepts.</p> | <ul style="list-style-type: none"> • Number of verified student instruction and training hours • Student knowledge gain |
| 12 | <p>Increased student knowledge, skills, and abilities in STEM, energy efficiency (EE) concepts, IDSM subject matter, and energy career pathways (J) leads in the short and mid-term to Increased awareness of energy career opportunities (K). Students gain more exposure to energy concepts and career pathways available to them through the program. Oriented towards students.</p> | <ul style="list-style-type: none"> • Student knowledge gain • Number of students provided with career awareness/experience • Increased students' interest in energy careers |
| 13 | <p>Increased awareness of energy career opportunities (K) leads in the short-, mid-, and long-term to students implementing pro-environmental behavior changes and influencing long-lasting, sustainable</p> | <ul style="list-style-type: none"> • Number of students provided with career awareness/experience • Student knowledge gain |

| Link | Segment Theory | Potential or Existing Key Performance Indicator for Future Consideration |
|------|---|--|
| | <p>changes (L). As students gain more experience with energy concepts, they can apply their knowledge through hands-on activities at home. This will encourage energy savings and sustainable behaviors in the student and family.</p> | <ul style="list-style-type: none"> • Increased student interest in energy careers • Increased sustainable energy behavior |
| 14 | <p>A robust network of STEM organizations and local education providers supporting DACs with resources and career exploration opportunities (M) leads in the short and mid-term to increased awareness of energy career opportunities (K). Increased number of partnerships established through the program with local education providers will increase the number students that are made aware of energy career opportunities. Oriented towards students and local education providers.</p> | <ul style="list-style-type: none"> • Number of partnerships established • Number of local education providers served • Number of disadvantaged local education providers served • Increased awareness of energy education and career opportunities |
| 15 | <p>Increased student knowledge, skills, and abilities in STEM, energy efficiency (EE) concepts, IDSM subject matter, and energy career pathways (J) leads to a growing pipeline of students interested in pursuing energy-focused post-secondary education and careers (O) in the mid-term. Increased participation in the program will lead in the mid-term to additional students gaining exposure to EE related subject matter thus increasing the number of students in the EE pipeline. Oriented towards students.</p> | <ul style="list-style-type: none"> • Increased student knowledge gain • Increased student interest in energy careers and post-secondary education |
| 16 | <p>A growing pipeline of K-12 students interested in pursuing energy-focused post-secondary education and careers (O) leads in the long term to more people pursue jobs in the EE industry (P). Oriented towards students.</p> | <ul style="list-style-type: none"> • Increased student interest in energy careers • Increased pipeline of students who pursue jobs in the EE industry |
| 17 | <p>More people pursue jobs in the EE industry (P) leads in the long term to Increased number of skilled workers in EE fields (Q). As more students pursue post-secondary education and careers, the long-term goal is to have more people pursue jobs in the EE industry and to subsequently increase the number of skilled workers in the industry.</p> | <ul style="list-style-type: none"> • Increased awareness of energy education and career opportunities |
| 18 | <p>Increased awareness of energy career opportunities (K) leads in the long-term to Increased number of skilled workers in EE fields (Q). Exposure to the program increases students' awareness of career opportunities in the energy field and helps to build a pipeline of students pursuing post-secondary education in the field. The emphasis of this path is on students.</p> | <ul style="list-style-type: none"> • Increased awareness of energy education and career opportunities • Increased pipeline of students who pursue jobs in the EE industry |
| 19 | <p>Increased number of skilled workers in EE fields (Q) leads in the long term to students implementing pro-</p> | <ul style="list-style-type: none"> • Increased sustainable energy behavior |

| Link | Segment Theory | Potential or Existing Key Performance Indicator for Future Consideration |
|------|---|--|
| | <p>environmental behavior changes and influencing long-lasting, sustainable changes (L). As students gain more experience with energy concepts and pursue additional EE opportunities they can apply their knowledge through hands-on activities at home. This will encourage energy savings and sustainable energy behaviors in the student and family.</p> | |
| 20 | <p>A robust network of STEM organizations and local education providers supporting DACs with resources and career exploration opportunities (M) leads in the long- term to an increased number of skilled workers in EE fields (Q). Oriented towards increased engagement with community partners, local education providers, and students.</p> | <ul style="list-style-type: none"> • Increased student interest in energy careers • Number of local education providers served • Number of disadvantaged local education providers served • Number of partnerships established |

After thorough review of existing program documentation and existing PTLMs, and the development of the updated PTLM, Opinion Dynamics concludes that the program theory and linkages of program activities to short-, mid-, and long-term outcomes are plausible.

Is it feasible to expect the intended outcomes?

Table 1 outlines potential and existing KPIs that support the PTLM activities and outcomes. The PTLM ultimately outlines how key program activities and outcomes will contribute to short-, mid-, and long- term goals set by the program and how it will help to achieve the goals set by the overarching WE&T program. The KPIs in green are proposed additions to be included to ensure it is feasible to expect the intended outcomes. Below we outline the potential KPIs that the evaluation team recommends adding:

- Increased access to EE educational opportunities
 - **Reasoning:** The evaluation team recommends adding this KPI to effectively measure the penetration of different educational opportunities in participating education providers’ curricula. Measuring the lasting impacts of EisE curriculum is an important step to achieving the mid- and long-term goal of normalizing IDSM subject matter, energy efficiency (EE) concepts, STEM concepts, and energy career pathways in local education providers’ curricula statewide and ensuring that EE educational opportunities are widely available and accessible.
 - **Operationalization:** For this KPI to be measurable, the implementer will need to collect contact information for the local education providers, disadvantaged education providers, and teachers enrolled in the program. The implementer should consider adding a clause in contracts with local education providers to notify them that they may be selected to participate in evaluation activities. The evaluator will then use this information to contact education providers to understand how access to EE educational opportunities have changed due to program implementation. We also recommend that the implementer collect contact information for program partners such as environmental education networks and education resource centers to understand how the program has impacted the greater network in terms of increased access to EE educational opportunities.
- Increased pipeline of students who pursue jobs in the EE industry

- **Reasoning:** Given a long-term goal of the EisE program is an increased number of students in the energy career pipeline, we feel that this KPI is important to consider. While this could be difficult to measure, the feasibility of a growing pipeline of K–12 students interested in pursuing energy-focused post-secondary education and careers leading to more people pursue jobs in the EE industry is a logical connection. Therefore, the evaluation team recommends adding this KPI.
- **Operationalization:** If this is a prioritized evaluation objective in the future, an evaluator may need to work with the implementer to collect contact information and help with recruitment for a longitudinal study. At this point in time, this is not an established implementation activity, and no changes need to be made to the implementation plan to measure this KPI.
- Increased awareness of energy education and career opportunities
 - **Reasoning:** A short- and mid- term goal of the EisE program is increased awareness of energy career opportunities. We propose tracking the level of awareness of the energy career pathways among students to measure the overall effectiveness of lessons taught through the program. Year over year pre- and post-learning surveys combined with qualitative data collected from educators will be used to show the change in level of awareness of energy career pathways of students in the program.
 - **Operationalization:** For this KPI to be measurable, the implementer and evaluation team will have to work together to add questions to the pre- and post-learning surveys. The data collection will be conducted by the implementer.

Given that the EisE program is a new offering for the WE&T Initiative, it is important to consider if adequate data is being collected to support evaluation in the future. Through our assessment we believe that the program is collecting most of the data needed to support an evaluation of future years of the EisE program. As mentioned above, Opinion Dynamics recommends that at the outset of each evaluation, CPUC, PG&E, the implementer, and the evaluator(s) discuss which linkages in the PTLM need investigation based on how the program has unfolded and operated in that year.