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ENERGY RESEARCH AND DEVELOPMENT DIVISION

FINAL PROJECT REPORT

Connecting Customers and Service Providers: A Procurement Software Solution for California

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PREFACE

The California Energy Commission's (CEC) Energy Research and Development Division supports energy research and development programs to spur innovation in energy efficiency, renewable energy and advanced clean generation, energy-related environmental protection, energy transmission, and distribution and transportation.

In 2012, the Electric Program Investment Charge (EPIC) was established by the California Public Utilities Commission to fund public investments in research to create and advance new energy solutions, foster regional innovation, and bring ideas from the lab to the marketplace. The EPIC Program is funded by California utility customers under the auspices of the California Public Utilities Commission. The CEC and the state's three largest investor-owned utilities— Pacific Gas and Electric Company, San Diego Gas and Electric Company, and Southern California Edison Company—were selected to administer the EPIC funds and advance novel technologies, tools, and strategies that provide benefits to their electric ratepayers.

The CEC is committed to ensuring public participation in its research and development programs that promote greater reliability, lower costs, and increase safety for the California electric ratepayer and include:

- Providing societal benefits.

- Reducing greenhouse gas emission in the electricity sector at the lowest possible cost.

- Supporting California's loading order to meet energy needs first with energy efficiency and demand response, next with renewable energy (distributed generation and utility scale), and finally with clean, conventional electricity supply.

- Supporting low-emission vehicles and transportation.

- Providing economic development.

- Using ratepayer funds efficiently.

Connecting Customers and Service Providers: A Procurement Software Solution for California is the final report for the TradePro Connect Product and Services Procurement project (Grant Number EPC-17-025) conducted by Energy Solutions. The information from this project contributes to the Energy Research and Development Division's EPIC Program.

For more information about the Energy Research and Development Division, please visit the CEC's research website (www.energy.ca.gov/research/) or contact the Energy Research and Development Division at ERDD@energy.ca.gov.

ABSTRACT

The TradePro Connect project conducted both a scaled demonstration and the deployment of an online procurement and energy service platform to spur the installation of distributed energy resources and energy management technologies. This project could ultimately drive widespread penetration of distributed energy resources in California and help meet the state's aggressive goals to reduce greenhouse gas emissions. Known barriers to procurement exist for customers and service providers are exacerbated by distributed energy resources and energy management technologies that require advanced knowledge and training. TradePro Connect was developed to reduce such barriers and result in more demand-side projects leading to lower project costs, more projects in underserved markets, increased safety, and greater reliability. The project achieved some of its goals, resulting in expanded understanding of the distributed energy resource program landscape and service provider business drivers. TradePro Connect implemented two distributed energy resource programs, enrolled 83 service providers, and completed 28 projects. However, known barriers proved difficult to overcome and new barriers emerged during the project execution related to program development, platform functionality, and service provider engagement. Key lessons learned include: focus on first-use case before scaling; be aware of interactions when growing both customer bases and service providers; focus on plug-and-play products rather than customized services; offer a compelling value proposition to engage service providers; consider contractor risk tolerance, which varies by project type; and use an upstream approach to access and engage contractor networks. The project identified specific factors and interactions that can inform future efforts to increase penetration of distributed energy resources.

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Background

California's state and local institutions have established goals to reduce dangerous greenhouse gas emissions that become trapped in the atmosphere and contribute to climate change. For example, California's Clean Energy and Pollution Reduction Act (Senate Bill 350) set aggressive goals of reducing greenhouse gas emissions, and many cities, institutions, utilities, public agencies, and other large enterprises have adopted their own renewable energy, greenhouse gas reductions, and zero net energy goals. To support these goals, all sectors must scale their use of distributed energy resources — small-scale, local sources of energy connected to the power grid at the consumer side of the meter, such as solar panels — and energy management technology, such as smart thermostats that introduce optimization and smart automation in power distribution systems.

An increase in distributed energy resources would help California reach its greenhouse gas emission reduction goals by reducing air pollution emitted by traditional fossil fuel-fired generation and by reducing demand and providing supply to the grid as needed. The strategy regulating the purchase and installation of certain technologies, including distributed energy resources and energy management technologies, is called a procurement process. This process requires adherence to stringent guidelines and involvement throughout each link of the supply chain, including manufacturers, distributors, service providers or installation contractors, and end-use customers. The current market offers only fragmented tools for researching, shopping, or marketing products and services.

For instance, many customers use online marketplaces such as Amazon or Grainger to source products, but those sites provide limited insight into the greenhouse gas impacts of products and no guidance on which products best meet a customer's specific procurement standards. They also typically do not include a full representation of the distributed energy resource technologies available on the market. There are also fragmented solutions for customers to find qualified service providers, which include either online searches or word-of-mouth recommendations. Procurement solutions have not yet reduced the barriers that spur market adoption of distributed energy resources at a rate that will substantially contribute to California's energy and greenhouse gas emission reduction goals.

While procurement processes are designed to ensure efficiency and transparency, barriers and challenges exist for both customers and service providers. Procurement barriers for service providers include time-intensive research, complex requirements and processes, limited transparency in purchasing decision making, and administrative burdens, which together make it challenging to enter new markets and bid on work. These challenges are exacerbated by the complexities involved in recommending and installing distributed energy resources and energy management technologies, which unlike other products such as office supplies, furniture, or even traditional energy efficiency equipment, are more likely to involve additional installation, configuration, or enrollment steps that deliver ongoing customer and environmental benefits. Procuring a smart thermostat, programming it to efficiently manage space conditioning,

enrolling in a utility demand-response program, and setting an appropriate load-shed strategy for demand-response events require significant knowledge, coordination, and effort on behalf of both the service provider and the customer. Since service providers lack visibility and easy entry points into the market, they are less likely to pursue the potential opportunities or acquire necessary additional training. Similarly, customers face a degree of uncertainty, risk, and time-consuming effort when researching and identifying a project need, selecting a qualified service provider to execute the work, and navigating procurement requirements. Customers do not have the tools to find and compare the best prices, products, and providers for their procurement needs, and the use of multiple tools or platforms increases the complexity of these fragmented processes.

Project Purpose

Until now, customers and service providers have been using individual existing platforms to procure solutions. This project aimed to reduce procurement barriers to distributed energy resource products (for both service providers and customers) by integrating four existing platforms that address different areas of procurement of goods and services into one platform, called TradePro Connect. TradePro Connect would streamline the user experience and allow customers, program administrators, and other project developers to search for qualified service providers in their respective areas; request, evaluate, and select bids; schedule services; and provide feedback on their experience via short, automated satisfaction surveys. It would make the procurement process easier, cheaper, and more transparent, as well as cut confusion and time commitments, resulting in millions of dollars of lifetime energy savings. It would also connect utility customers and service providers directly to distributed energy resources and energy management technology products and services.

TradePro Connect also intended to level the playing field for smaller service providers to give them the tools to market their expertise to customers by improving customer awareness through transparency.

The TradePro Connect project is important for Californians because reducing barriers to procurement for distributed energy resources and energy management technologies can facilitate more demand-side projects, resulting in lower costs for similar projects, more projects in underserved markets, increased safety, and greater reliability. Utilities, institutions, and local governments can use the findings of the TradePro Connect project to better understand the barriers to distributed energy resource and energy management technology procurement and strategies to mitigate challenges in future programs.

The project objectives centered around accelerating the adoption of distributed energy resources via improved labor procurement practices, reduced costs, improved deployment, and a rigorous directory of eligible products and service providers. Project goals included deploying four programs on the TradePro Connect platform, enrolling 100 service providers (including 30 disabled veteran business enterprises), implementing 50 projects, incorporating a group-purchasing organization, achieving an excellent project rating from customers, and demonstrating and documenting project fault detection and diagnostic methods.

Project Approach

The TradePro Connect project team, led by Energy Solutions as the primary contractor, included software companies; trade-ally leadership organizations; workforce training organizations; and legal, marketing, and graphic design teams. Key stakeholders included partners and subcontractors from two separate (but similar and related) projects through the Procurement Innovation Solicitation and the California Evaluation Hub and Empower Procurement, as well as a technical advisory committee.

Research consisted of the real-world deployment of the TradePro Connect procurement tool into the market to spur procurement of distributed energy resources and energy management technologies in California. Energy Solutions configured the TradePro Connect platform to integrate with four software applications that individually offer procurement solutions (Qmerit, ProQure, ecomedes, and Manage Your Power), which run as a single platform. The team identified institutions and utilities interested in using the platform for their individual procurement needs for real-world deployments and provided four types of programs based on customer bases to attract potential institutional or utility programs: small- and medium-sized businesses, institutional programs (local government, K-12, higher education), residential programs, and distributed energy resource enablement and optimization. The project addressed both customer and service provider barriers in the procurement processes by giving customers tools to find the best prices, products, and providers for their needs while still providing transparency into procurement-process resources.

TradePro Connect experienced significant challenges during real-world deployment related to program coordination, platform functionality, and service-provider engagement. Specifically, launching TradePro Connect with four programs while simultaneously trying to attract customers and service providers proved difficult and resulted in low numbers of customers, service providers, projects, and programs on the platform. Because of the lack of customers, the platform's functionality was not fully realized.

One successful program, Solar on Multifamily Affordable Housing, had dedicated contractor and customer marketing resources that drove participation and provided training on how to participate in TradePro Connect. This program proved that with good engagement and resources, even highly customized offerings such as solar can succeed over less complex plug-and-play offerings such as thermostats. It also highlighted the importance of utility engagement and commitment to offering trainings, marketing resources, and requirements to use the platform for potential programs.

Similarly, the project faced integration hurdles as it became apparent that it was necessary to simultaneously address multiple utility needs. Lastly, engaging service providers to join TradePro Connect without defined participating programs and customer project needs proved challenging. Once service providers were signed up, attempting to onboard service providers at scale required trial and error that was not anticipated in the original plan.

Many of these challenges were exacerbated by the lack of institutional and utility participation on the platform. In Fall 2019, the team decided to focus on small- and medium-sized businesses as a single-use case and used CEC funds to deploy a targeted smart thermostat

promotion to help contribute to the project's goals. To receive the offer, customers and service providers were required to sign up and use TradePro Connect. The promotion was marketed in service provider channels across California and contributed to the project's service provider and project goals.

The project team formed a technical advisory committee to provide guidance on the real-world deployment of TradePro Connect. Committee members included companies that install and optimize adoption of electrification products, utilities, local and state government commissions and offices, and unions (whose feedback resulted in changes to the project's performance goals and additional considerations from workforce training and leadership organizations about the emphasis on safety, contractor licensing standards, and insurance).

Project Results

A portion of the stated goals for this project were achieved, which expanded understanding of the distributed energy resource program landscape and service provider business drivers. However, platform deployment barriers that emerged during the execution of the project, including challenges in enrolling customers and service providers, made it difficult to meet the project objectives and address all procurement barriers.

A portion of the stated goals for this project was achieved through the roll-out of two distributed energy resource programs: Southern California Edison Auto-Demand Response/Thermostats, and Center for Sustainable Energy—Solar on Multifamily Affordable Housing. The team enrolled 83 service providers on the platform and completed 28 projects. These programs expanded understanding of the distributed energy resource program landscape and service provider business drivers. It became clear that service providers are driven by the potential for new business opportunities through increased market awareness. In the past, service providers were offered similar platforms and utility programs that did not meet their needs or expand market awareness, so they were hesitant to use TradePro Connect.

A prototype was executed with participation from service providers in two participating programs. However, known barriers proved difficult to overcome and significant new challenges emerged during the project execution. Specifically, the prototype system operated successfully only for use cases in which contractor credentials were easily defined and program managers were accountable for engaging customers and service providers, as seen in the Southern California Edison Auto-Demand Response/Thermostat and Solar on Multifamily Affordable Housing program.

While the project was only partially successful, competitive advantages were achieved. Advantages included speed to market, proving that programs could be quickly made operational for customers and service providers to push distributed energy resources and energy management technologies projects forward, as well as proof to manage projects at volume. TradePro Connect included customer portfolios for multiple project sites and facilitated customers' connections to a single vetted and quality service provider that could connect them to group purchasing organization resources and utility rebate programs. This connection benefits the customer, service provider, and utility by providing a streamlined project

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experience, increased awareness for project and program resources, and deployment of distributed energy resources and energy management technologies.

Major lessons learned that could be valuable for a future effort to address procurement challenges follow.

1. Focus on one technology, first-use case, and a single program before scaling.

2. Consider timing to optimize the engagement and coordination of customers and service providers. Focus on plug-and-play products rather than those requiring customization or engineering support.

3. Ensure that the value proposition for service providers to engage and participate is compelling.

4. Consider contractor risk tolerance that varies by project type.

5. Use an upstream approach to access and engage contractor networks.

Further research and experimentation are needed to understand whether these recommendations would be sufficient to meet the challenges associated with procurement barriers.

The information learned from this project can assist public organizations to encourage more distributed energy resource and energy management technology products by simplifying procurement, providing more information or training to both customers and service providers about procuring energy products, and updating existing procurement systems to further remove existing barriers for both customers and service providers.

Sharing the Technology and Knowledge - Advancing the Research to Market

While no new technologies were built for this project, the information gathered generated a better understanding of procurement needs and challenges in the market and was shared while conducting the demonstration and deployment of an online procurement platform. Public landing pages on websites for TradePro Connect and Manage Your Power are the primary sources for sharing information with the marketplace and can be accessed through a web browser. Demonstrations to utilities and information sessions for prospective service-provider organizations were conducted and reports and marketing material developed and distributed to increase interest in the platform. Energy Solutions also shared the TradePro Connect product at the California Green Business Network Conference on October 17, 2019. Information sessions on TradePro Connect for the Southern California Edison Automated Demand Response program were held for several service provider organizations from December 2018 through March 2020.

The project primarily targeted utility efficiency programs, but near-term and mid-term markets also included institutional customers and service providers. California accounts for about 5 percent of utility-scaled electricity net generation in the United States, so there is significant market potential for further deployment of similar distributed energy resources and energy management technology procurement solutions. The product and its subsequent research

have been used by utilities and institutional customers considering their program procurement, but there was not enough activity to warrant user feedback. Barriers to commercialization must be addressed before scaling TradePro Connect. The biggest barrier is the causality dilemma: to encourage service providers to join the platform, the platform needs service providers, but customers have no use for the platform if there are not yet available service providers to choose.

Members of the technical advisory committee shared platform progress with their internal teams for potential program participation. For example, representatives from Pacific Gas and Electric Company attended meetings to better understand the offering and consider it for future proposals or bids. Similarly, workforce organizations were able to recognize the benefits of the platform and consider sharing them with organization members.

Energy Solutions plans to continue exploring opportunities for bringing streamlined procurement solutions to market. For instance, Qmerit has been successful in addressing the causality dilemma in the electric vehicle market by narrowing the scope of services to the installation of Level 2 electric vehicle supply equipment at residential properties. Energy Solutions is exploring opportunities to expand on this foundation to offer additional related services, such as integrating utility rebate offerings and ongoing charging programs.

Benefits to California

The benefits of this research are economic, environmental, and societal. The primary audiences for the results of this research include public organizations, institutions, workforce organizations, and energy utilities.

Under the right conditions, TradePro Connect can result in ratepayer benefits including lower costs for demand side management projects, new projects in underserved markets, and greater reliability. By streamlining the procurement process for distributed energy resources and energy management technologies, TradePro Connect could generate greater demand for these technologies (both from consumers and service providers), incentivizing further investments in distributed energy resource research, development, and workforce training. TradePro Connect could vastly decrease the risk, time investment, and inflated costs that characterize the procurement processes for many customers. Through TradePro Connect, customers can have greater transparency into their providers' past results and feel confident knowing the contractor they select has been thoroughly vetted by industry experts. The technology is intended for customers and service providers and cannot be adapted to a business or resident.

The findings and outcomes of this project can set the groundwork for future studies since it sheds light onto further barriers and areas of opportunity for research, including:

- Optimization of model matching computations that increase speed of response.

- Software modifications needed to enhance scalability with a diverse group of product categories.

- Cost analysis of additional software functionality tradeoffs.

- Advantages to users of additional features such as dashboards or filtering.

CHAPTER 1:
Introduction

In 2015, California's Clean Energy and Pollution Reduction Act (Senate Bill 350 [SB 350]) (de León, Chapter 547, Statutes of 2015) established aggressive goals of reducing greenhouse gas (GHG) emissions to 40 percent below 1990 levels by 2030 and to 80 percent below 1990 levels by 2050. To maintain a clean, reliable, and low-cost electric power supply with the increasing penetrations of solar photovoltaics and electric vehicles (EV), the need for comparable levels of battery storage, control systems, and connected building loads became apparent. To achieve California's energy and carbon goals, distributed energy resources and energy management technologies must scale rapidly across all sectors. Distributed energy resources (DERs) are small-scale, generally local sources of energy located on the consumer side of the meter and interconnected to the power grid. Examples include roof-top solar photovoltaic units, wind-generating units, and battery storage. Energy management technology (EMT) is software enabling the user to optimize and automate power distribution systems for better control and monitoring. Smart thermostats are one example. This need has been the impetus for additional legislative and regulatory activities, including:

- California's building energy code (Title 24, Part 6), requiring controls and demand response (DR) capabilities.

- Assembly Bill (AB) 802 (Wieckowski, Chapter 870, Statutes of 2014), requiring utility programs to move toward calculating energy savings based on normalized metered energy consumption of advanced metering infrastructure data.

- Senate Bill (SB) 350's responsible contractor policy.

- Assembly Bill (AB) 2514 (Skinner, Chapter 469, Statutes of 2010) battery requirements.

- Assembly Bill (AB) 793 (Quirk, Chapter 589, Statutes of 2015) EMT requirements.

Additional legislative activity, such as Assembly Bill 758 (Skinner, Chapter 734, Statutes of 2006), required institutional customers like the State of California and the University of California to reduce both energy use and GHG emissions. Their buildings and those served by facility managers and energy savings performance contracts require procurement processes that adhere to stringent guidelines designed to ensure efficiency and transparency.

California's energy efficiency programs are also undergoing a significant shift that began with a new regulatory process in 2018. The wholesale power market is expanding to include more demand-side resources. Utilities are obtaining energy efficiency and other DERs through supply side procurement. Investor-owned utilities' energy efficiency and DER programs are all moving toward an outsourced third-party model, while the emergence of community choice aggregators (CCAs) further fragments California's demand side management (California Public Utilities Commission 2018). Furthermore, many cities and public agencies, as well as large enterprises, have adopted their own aggressive renewable energy, GHG reduction, and zero net energy (ZNE) goals. Since DER strategies often require data from utilities (for example,

advanced metering infrastructure interval energy consumption data) and customers (such as building management systems data), as well as knowledge of incentive offerings, a fragmented utility landscape contributes to barriers for DER development.

In addition to energy products that reduce energy usage and GHG emissions, a robust procurement strategy throughout each link of the supply chain is needed to support these organizations and make the process of purchasing and installing DERs and EMTs easier, cheaper, and more transparent through better information, standardization, and education. It is important to engage each member of the supply chain—manufacturers, distributors, service providers, and end-use customers—to increase efficiencies and ensure that DER products are installed and provide the greatest impact. Manufacturers influence product availability, product specifications, and efficiencies and may offer extensive product knowledge and installation training and certifications for service providers. Distributors influence stocking decisions, prioritizing investments and precious shelf space for products that will sell in the market. Most notably, service providers must be trained to properly install and commission products, and customers must be offered informational resources to navigate and procure DER products. From manufacturers to distributors, service providers, and customers, proper product selection, design, installation, commissioning, operations, and maintenance are critical to realizing the promise of real-time operational benefits.

Many facility managers have already updated their buildings with low-cost retrofits, but to meet California's ambitious energy goals facility managers need to tackle more expensive and comprehensive energy retrofits, which can be supported by a more robust procurement strategy. However, there are identified barriers to development of a robust procurement strategy from customer and service provider perspectives.

Known Barriers

Barriers for Customers

The term "customer" includes institutional buyers, facility and portfolio managers, small- and medium-sized business owners, and end-use stakeholders. Customers are the decision makers who seek services. Customers face uncertainty, risk, and time-consuming effort when pur-chasing DER and EMT goods and services. Existing procurement processes for DERs and EMT lack effective transparency mechanisms that would allow customers to confidently navigate product options and select a contractor who is well-versed in industry standards, qualified, and experienced. The most crucial (and difficult to overcome) barriers for customers include:

1. *Time-Intensive Research:* Customers undergo time- and resource-intensive online or offline research to find service providers that will complete energy projects. Online web searches, calling service providers from utility "trade ally" lists, or contacting networks for referrals all take time and provide little promise of either quality or competitive cost. It can also be difficult for customers to locate and procure the products and services necessary to achieve energy and sustainability goals within required timeframes. Facility management buyers tend to use existing institutional procurement channels, which may not include information and education on clean-

technology products and services. Customers must still make these decisions, even when lacking complete or objective information.

2. *Selecting a Qualified Service Provider:* While customers can reference a variety of platforms to seek service providers (for example, utility trade ally websites, third-party sites like Angie or Yelp, and even word-of-mouth references from colleagues), they may lack confidence in choosing a trustworthy platform and are burdened by the process of wading through tens if not hundreds of contractor choices. The criteria by which a service provider is deemed qualified and of quality are not simple. Factors such as the contractor license type, familiarity with installing and supporting a range of technology and newer solutions, training and in-the-field hours or certifications completed, number of jobs completed, or customer satisfaction results may all be considered. While utility listings may offer brand recognition and an assumed degree of vetting, utilities must maintain vendor neutrality and do not allow staff to offer specific recommendations.

3. *Complex Procurement Requirements and Processes:* Institutional buyers (one type of customer) are required to navigate many complex processes requiring detailed product and service information that is not always easily available.

For example, California agencies are charged with implementing several state policies with respect to energy, GHG reductions, and sustainability. At the same time, they must follow state rules on bidding and contracting when engaging third parties to provide goods and services. Staff is often time- and resource-constrained. There is also often a lack of technical capacity to develop projects, and it can be difficult to access, manage, and report on building energy consumption data, making benchmarking portfolios difficult. Cumbersome competitive bidding policies also make it difficult to retrofit smaller facilities. The result is that projects often are not completed, and agency staff may bypass organization policies, including following competitive bidding requirements or green purchasing guidelines.

Local governments are similar to state governments in that they have aggressive energy, water, and GHG reduction goals. These smaller governments also face distinct challenges, including but not limited to:

- Bandwidth constraints for staff to create, introduce, and manage compliance with green purchasing standards.
- Inadequate purchase volume and staff bandwidth to negotiate with suppliers.
- Inadequate procurement systems.

Barriers to Service Providers

Service providers with specialized skill sets relating to DERs may not be visible to institutional buyers, making it difficult for them to find and win projects that would benefit from their knowledge and ability to boost energy savings potential; DER products and markets are generally complicated and difficult for new entrants to understand and penetrate. Data from utilities and knowledge of incentive offerings are often required to execute effective DER

strategies. These together create significant complexity for any service provider, especially for one whose core business focus does not include DERs.

While a multitude of projects show the efficacy of new DER technologies, no programs assist service providers and end-use customers with finding and sourcing best-in-class DER products, services, and solutions, at preferential prices. California's AB 793 recognizes that residential and small- and medium-sized business markets are unable to adequately adopt DERs and EMT due to the variety of logistical barriers faced by service providers. The most crucial (and difficult to overcome) include:

1. *Decentralized Bidding Process and Access to Program Information:* Service providers must respond to bids, demonstrate compliance with utility programs, and access important program information through a decentralized and scattered process, some-times within a single utility. Participation in utility trade ally networks or energy programs is patchwork. Information about program requirements and the incentive payment process is often scattered across the internet, especially if a service pro-vider's territory or suite of offerings encompasses multiple utility jurisdictions or program areas.

2. *Restrictive Purchasing Requirements Limit Product Availability:* Service providers often purchase wholesale products through a few select distributors that may have brand restrictions. These restrictions may not align with requirements by institutional customers.

3. *Limited Awareness of Customer Purchasing Process and Decision Making:* Independent or small-outfit service professionals have limited visibility into the purchasing process of large institutional organizations. Building trade service providers and engineers purchase $29.6 billion in parts and equipment each year for service, maintenance, and retrofits. Apart from a few large firms, this major buying group does not obtain volume pricing from suppliers. The result is higher costs for end customers, creating a barrier to sales.

4. *Administrative Burdens:* The Responsible Contractor Policy included in SB 350 requires any contractor receiving a utility rebate or incentive payment to have all necessary licenses, insurance, and certification. While this ensures a high level of quality service for customers, it also creates administrative burdens for service providers to show compliance. Service providers installing rebate-eligible DER products must navigate different processes and systems for different utilities to prove their credentials to apply for rebates. These processes may be complex and cumbersome and require training or education. These administrative components require service providers to devote time that could otherwise be spent on revenue-generating activities. As a result, service providers may shy away from including DERs in proposals or "price-in" risk by passing costs on to customers.

Market Conditions

Both information gaps and lack of clear business propositions hamper development of DERs in the market for building-energy improvements, inhibiting progress toward achieving California's energy goals. Customers do not currently have the tools to find and compare the best prices, products, and providers for their procurement needs. Service providers lack visibility in the market and do not perceive significant opportunities that would motivate them to pursue potential opportunities or additional training. Existing tools for researching, shopping, or marketing products and services are highly fragmented and lack details relevant to the needs of DER buyers. Due to entrenched technologies and structural conditions, solutions have not emerged organically to catalyze DER adoption by the market.

TradePro Connect is an online procurement and energy service platform designed to address these conditions and overcome barriers (discussed in Chapter 2) by establishing a marketplace for customers, manufacturers, distributors, and service providers alike to find best-in-class products, qualified service providers, and other resources needed to scale adoption of DERs. As a singular platform with the ability to support multiple programs and provide access to a variety of technologies and service specialists, TradePro Connect can bridge information gaps by informing purchasers with comparative data on options and benefits (discussed in Chapter 2). One goal of this project was to help purchasers and service providers more easily take advantage of utility-sponsored incentives to acquire qualifying technologies. These incentives reduce overall project costs and encourage DER and EMT installations.

CHAPTER 2:
Project Purpose and Approach

This project was a scaled demonstration of an online procurement and energy service platform, integrated with a group purchasing organization for service providers and customers of DER and EMT products and solutions. The following section provides background on this demonstration, how it was executed, its features, and the goals and objectives for the project.

Project Goals and Objectives

The goals of this project were to:

1. Accelerate adoption of DERs by using a qualified labor force to streamline customer procurement, program enrollment, and operations and maintenance services.

2. Reduce the capital cost of DER products and solutions by launching a DER group purchasing organization (GPO) that integrates the supply chain and facilitates healthy competition in the marketplace.

3. Maximize the performance of deployed DERs by offering performance-based incentives, conducting ongoing measurement and verification, offering education and training to the service network, and enforcing rigorous quality standards.

4. Manage the largest DER directory and the most competent network of DER service providers in California.

The objectives of this project were to:

1. Incorporate a DER product strategy in the recipient's GPO to promote best-in-class DER solutions over standard practice items.

2. Configure, integrate, and deploy four DER programs on the TradePro Connect platform.

3. Enroll a minimum of 100 contractor organizations on the platform, directing at least 30 jobs to small, disabled veteran, minority, lesbian, gay, bisexual, transgender (LGBT) and/or female business enterprises.

4. Implement at least 50 projects during the 18-month project period, generating $2 million of lifetime energy savings across a multitude of sectors, end uses, and services.

5. Achieve an average customer satisfaction rating of 4.5 out of 5.

6. Demonstrate and document methods that use utility advanced metering infrastructure and manufacturer monitoring, fault detection, and diagnostics to optimize operations and right-time maintenance.

Approach

The approach for the TradePro Connect project consisted of two phases: product configuration and real-world deployment. The project team planned to integrate TradePro Connect with other software applications familiar to the target audiences to reduce known barriers to procurement, followed by introduction and installation for interested institutions, utilities, and other agencies that would use the platform for their procurement program needs. This chapter details the various stakeholders and the intended plan to integrate products that provide procurement solutions for customers.

Team and Stakeholders

The project team was comprised of Energy Solutions as the prime contractor, software companies, trade ally leadership organizations, workforce training organizations, and legal, marketing, and graphic design teams. The project team and roles are listed in Table 1.

Table 1: Project Team and Roles

Organization	Role
Energy Solutions	Prime contractor, project management, platform partner
Qmerit	Platform partner
ProQure	Platform partner
ecomedes	Platform partner
Local Government Commission	Local government outreach and engagement
ASWB Engineering	Workforce training and development
National Electrical Contractors Association	Workforce leadership (program requirements and design, contractor recruiting, etc.)
Wendell Rosen	Legal services to review platform participation agreement contracts
Xiomara Castro and Tanner Schutt	Marketing, digital, and graphic design

Other groups of stakeholders included two separate (but similar and related) projects through the Procurement Innovation Solicitation, the California Evaluation Hub, and Empower Procurement. The California Evaluation Hub evaluated selected DER products, provided direct comparisons among those products, and shared results with large commercial and institutional customers that use formal procurement processes. This project continued through 2022. While this project is on a different timeline than TradePro Connect, its results could inform future programs and TradePro Connect use cases. The project is led by the Energy and Efficiency Institute at the University of California, Davis, and key partners include Energy Solutions, Lawrence Berkeley National Laboratory, and the University of California, Berkeley Center for the Built Environment. Empower Procurement helps organizations reach their clean energy and GHG reduction goals by improving the procurement process through tailored initiatives known as procurement initiatives. Procurement initiatives are designed to provide the opportunity for institutional entities—including local governments, school districts, and public higher education

institutions—to leverage complementary assistance to troubleshoot products and service contract procurement, electrification strategic planning, or other procurement-related challenges. This project will also continue through 2022 and while on a different timeline than TradePro Connect, has worked with the TradePro Connect team to understand the trials and errors associated with procurement program development. Technology solutions like TradePro Connect may be considered as one type of recommendation for institutions that enroll in the initiatives. The project is led by Prospect Silicon Valley, and key partners include Energy Solutions, Lawrence Berkeley National Laboratory, and the ZNE Alliance. Minor partners include the Local Government Commission, among others.

Lastly, the project's technical advisory committee (TAC) represented a stakeholder group that provided guidance on scope and recommendations on information dissemination, market pathways, and commercialization strategies. Members of the TAC are listed in the Technical Advisory Committee section at the end of this chapter.

Product

The TradePro Connect platform was intended to be a single platform through which various procurement solutions would be offered. Services providers that participated in a utility or institutional procurement program on TradePro Connect would log onto the platform to view and respond to bids and purchase equipment. The intent was to integrate four specific platforms into one streamlined experience through TradePro Connect to connect utility customers and service providers to DER and EMT products and services. Details of the integration activities, market barriers and challenges, and success factors during the research and experimentation phase are discussed in this chapter. Each market barrier—roles, rules, and tools—was an opportunity for the TradePro Connect platform to improve customer and service provider experiences. Unfortunately, in the work taken to develop the platform and address these barriers, new challenges arose.

Figure 1 presents the intended platform structure.

Figure 1: Platform Structure

Source: Energy Solutions

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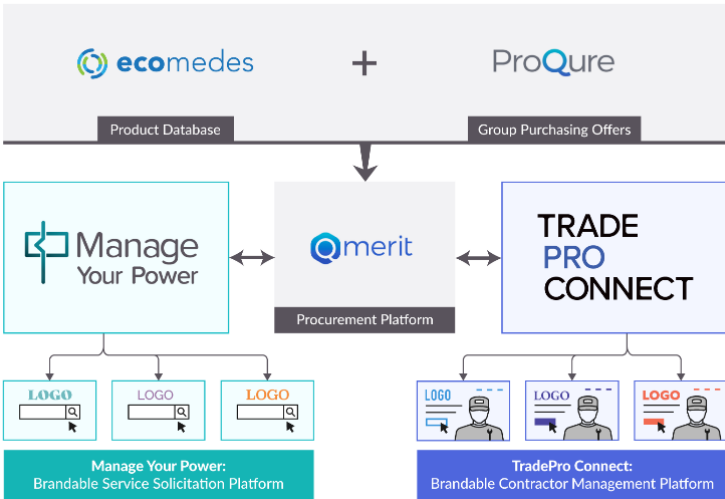
The following software applications were planned for integration:

- **Qmerit**[1] is a leader in service logistics for managing distributor labor forces. Qmerit provides logistical services and allows service providers to provide credentials, view bid 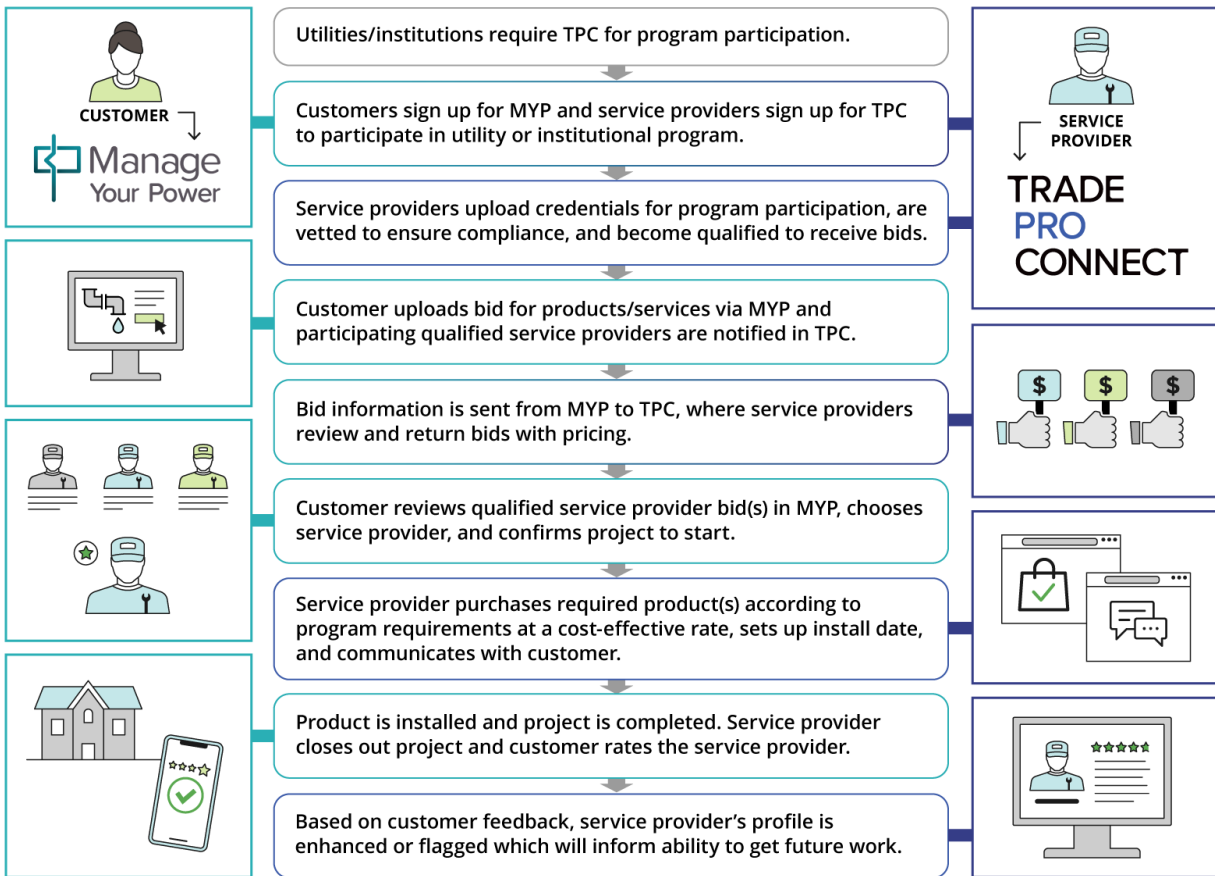requests, and submit bids. As projects occur, Qmerit monitors dozens of key service metrics including responsiveness to customer requests, bid prices, punctuality, customer feedback, and inspection pass rates. If a service provider underperforms in one of these areas, it is temporarily prevented from receiving additional work opportunities either automatically by the system or manually by the program administrator. The platform identifies recurring performance issues so that the program administrator can either encourage or require that the contractor complete training prior to receiving additional bids for the service in question. Over time, service providers that perform good work at a fair price benefit from receiving more jobs because customers have transparency in viewing their previous performance, trainings, certifications, and customer reviews. See APPENDIX B: Platform Screenshots, for screenshots of the platform.

- **ProQure** houses the GPO, which "realizes savings and efficiencies by aggregating purchasing volume and using that leverage to negotiate discounts with manufacturers, distributors, and vendors." The GPO platform vets products and negotiates pricing, which allow service providers to purchase products at discounted rates. Without a GPO, negotiating prices can be a time-intensive process, made especially difficult for service providers with limited time and resources. See APPENDIX B: Platform Screenshots, for screenshots of the platform.

- **ecomedes** is a platform directory that provides objective, third-party-validated information on energy, water, materials, human health, and lifecycle operations, and maintains a structured data format that allows all certifications and test results to be accessed at the click of a button. ecomedes offers a sustainability product directory that includes 5,000 brands, though this project used only DER and EMT products. See APPENDIX B: Platform Screenshots for screenshots of the platform.

- **Manage Your Power** is the customer interface where customers participating in a utility program submit their project requests, which are then routed to TradePro Connect where service providers can view and respond to customer project bids. Manage Your Power was branded and developed by Energy Solutions using Django Python, then integrated with TradePro Connect to connect customers to service providers. See APPENDIX B: Platform Screenshots for screenshots of the platform.

To use the platform, utilities and institutional programs purchased access to the TradePro Connect platform and their customers and service providers were required to use the platform to participate in programs. Customers were required to submit bids and choose service providers via Manage Your Power, and service providers were required to review bids, respond to customers, purchase equipment, and close out projects via TradePro Connect. Service providers were required to upload their program-required credentials to the platform in order

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[1] In 2020, QMerit was rebranded as Raiven to offer a procurement platform for electric vehicle programs. However, the name QMerit will be used throughout this report for continuity.

to participate in both utility and institutional programs. Figure 2 illustrates the project life cycle.

Figure 2: Project Life Cycle in TradePro Connect

Utilities/institutions require TPC for program participation.

Customers sign up for MYP and service providers sign up for TPC to participate in utility or institutional program.

Service providers upload credentials for program participation, are vetted to ensure compliance, and become qualified to receive bids.

Customer uploads bid for products/services via MYP and participating qualified service providers are notified in TPC.

Bid information is sent from MYP to TPC, where service providers review and return bids with pricing.

Customer reviews qualified service provider bid(s) in MYP, chooses service provider, and confirms project to start.

Service provider purchases required product(s) according to program requirements at a cost-effective rate, sets up install date, and communicates with customer.

Product is installed and project is completed. Service provider closes out project and customer rates the service provider.

Based on customer feedback, service provider's profile is enhanced or flagged which will inform ability to get future work.

TPC = TradePro Connect; MYP = Manage Your Power

Source: Energy Solutions

Research

The research for this project consisted of real-world deployment of a procurement tool in the market to spur DER and EMT projects in California. Originally, the TradePro Connect scope of work included an offering to configure forms, workflows, and validations for the following (or similar) programs:

- Manage Your Power
- Self-Driving Buildings™
- Efficient Supplier Program
- Residential ZNE GPO

Energy Solutions conducted research into these four targeted sectors and concluded that they had significant customer overlap. Two of the programs served the same customer base, creating confusion among multiple audiences. Since an overarching project goal was to ensure

a simple customer experience, the scope was updated to include four new programs with clear market targets and purposes for utility participation:

- Small- and Medium-Sized Businesses

- Institutional (local government, K-12, higher education)

- Residential (combines aspect of ZNE GPO and beneficial electrification programs that included in the proposal)

- DER Enablement and Optimization

TradePro Connect targeted small- and medium-sized businesses through SCE's Automated Direct Response (Auto-DR) smart thermostat offering, and DER enablement and optimization through the utility's Solar on Multifamily Affordable Housing (SOMAH) program. Unexpected prohibitive challenges, described in the next section, prevented the program from reaching institutional and residential markets.

Addressing Barriers

As described in the Known Barriers section in Chapter 1, TradePro Connect attempted to address both customer and service provider barriers and give customers the tools to find the best prices, products, and providers for their procurement needs.

As research with city stakeholders progressed (Market Adoption, Chapter 4), it became clear that barriers fell into three categories: roles, rules, and tools. This framework originated with Lawrence Berkeley National Laboratory, a key partner for Empower Procurement, and makes sense in the TradePro Connect project.

- *Roles:* Lack of staff bandwidth and a clear organization chart related to services procurement

- *Rules:* Need for organizational procurement guidelines or refinement

- *Tools:* Need for technology solutions and training on how to use existing tools

As the research advanced, multiple challenges arose, which inhibited progress in meeting project goals and addressing barriers. This section outlines some of these challenges and actions to overcome them. Lessons Learned in Chapter 3 goes into more detail about the project's challenges and future recommendations for addressing those procurement and associated challenges.

Barrier Category: Rules

Barrier 1: Time-Intensive Research

TradePro Connect was intended to create a centralized location for customers to find qualified service providers within their areas with the expertise to recommend and install DER and EMT products. As shown in Figure 3a, customers filled out their project requirements with necessary information required by service providers who evaluate and bid on the work.

Customers then received multiple bids, as shown in Figure 3b, reducing time-intensive research.

Figure 3a: Manage Your Power User Inputs

Source: Energy Solutions

Figure 3b: Top Three Service Providers Output

	Contractor A	Contractor B	Contractor C
Estimated Cost	$2,981	$3,190	$1,578
Total System Size (CEC-AC)	55kW	57kW	52kW
Projects Completed	5 projects	20 projects	7 projects
CSLB #	########	########	########
Licenses & Qualifications	C-10 License Veteran-Owned	C-10 License	C-10 License Certified Small Business

Source: Energy Solutions

Barrier 2: Complex Procurement Requirements and Processes

TradePro Connect was intended to streamline the procurement process for customers, compliance for which can often be difficult to follow, implement, and manage due to resource bandwidth constraints, inadequate product purchase volumes and negotiating power, and general lack of platform procurement systems. As shown in Figure 4, complex procurement requirements and processes result in numerous customer questions and concerns, which can delay (or even avoid) the purchase and installation DER process.

Figure 4: Customer Questions and Concerns
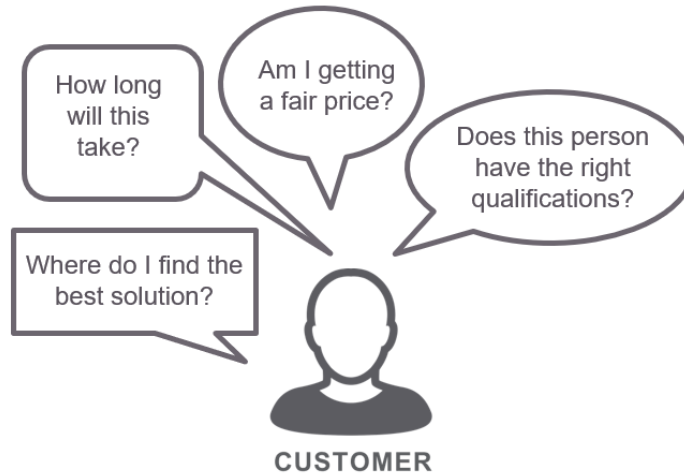
Source: Energy Solutions

Barrier 3: Decentralized Bidding Process and Access to Program Information

TradePro Connect was intended to be one centralized location for service providers to access the bidding process and program information. As shown in Figure 5, all available program and project opportunities were centralized for a service provider, with all necessary information in one location.

Figure 5: Service Provider Bid Management

Type	%	Name	Customer	City	Assignee	Priority	Due
	✓	SCE ADR For 4 Embarcadero Center	4 Embarcadero Center	SF		Medium	-3 years
	○	SCE ADR Bid For 3 Embarcadero Center	3 Embarcadero Center	SF		Medium	-3 years
	○	SCE ADR Bid For 2 Embarcadero Center	2 Embarcadero Center	SF		Medium	-3 years
	✓/x	SCE ADR Bid For 1 Embarcadero Center	Pending...	SF		Medium	-3 years

1 Activity, 3 Bids

Source: Energy Solutions

Barrier 4: Restrictive Purchasing Requirements Limit Product Availability

TradePro Connect was intended to increase the availability of product availability through the product directory and obtain better prices via the GPO. Both aspects would provide more options and remove brand restrictions for service providers. As shown in Figure 6, for participating programs ecomedes allowed a streamlined approach for purchasing products via the directory that met all program needs at the price specified by the GPO.

Figure 6: ecomedes Product Availability
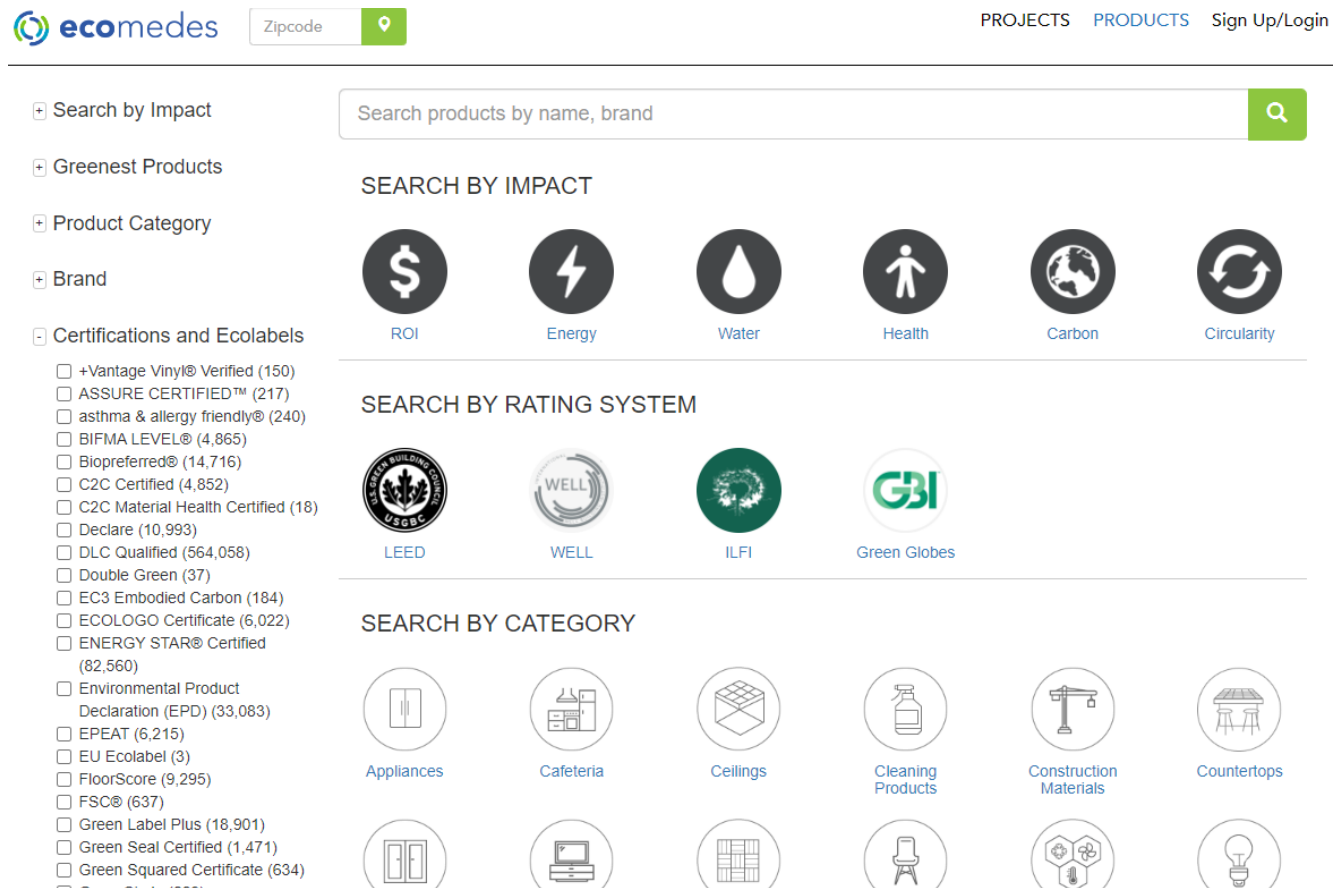
Source: ecomedes.com

Barrier Category – Tools

Barrier 5: Selecting a Qualified Service Provider

TradePro Connect was intended to be designed to algorithmically filter service providers based on qualifications and customer reviews, making it quick and easy for customers to select the top service providers for their jobs. As shown in Figure 7 from the SOMAH program, customers could easily view service providers who were qualified and vetted to participate in the program.

Figure 7: Selecting a Service Provider
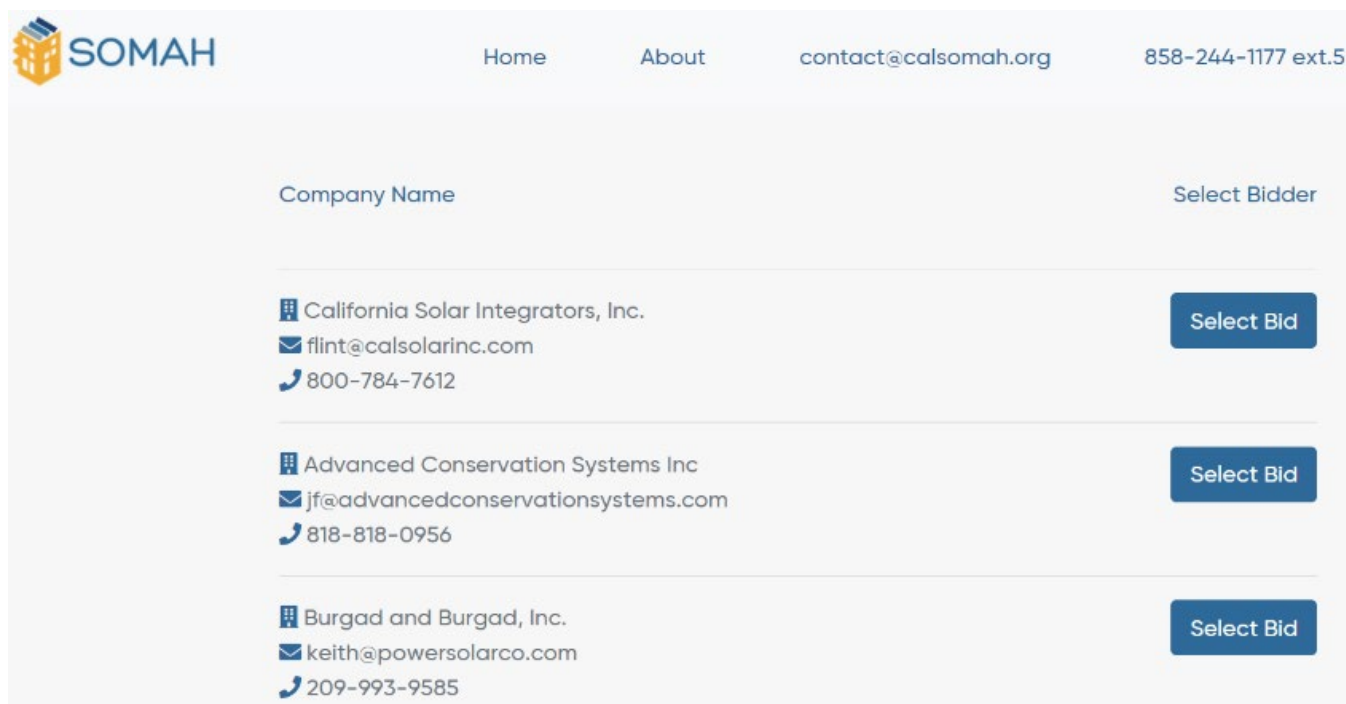
Source: Energy Solutions

Barrier 6: Lack of Training and Certifications

One of the goals of this project was to provide training and education to the service network. TradePro Connect's service provider user interface included a knowledge center, which service providers could use to access training and educational materials available from the network manager or utility program sponsors. This could include technical, program, or sales information in document, image, or video form.

Barrier Category — Roles

Barrier 7: Limited Awareness of Customer Purchasing Processes and Decision Making

This project intended to level the playing field for smaller service providers and give them tools to market their expertise to customers. The customer decision-making process was transparent on the platform and would have given service providers the opportunity to improve their customer awareness over time. Manage Your Power intended to increase customer awareness of smaller service providers via utility-sponsored program and community efforts, while also providing a platform for service providers to provide collateral, receive education, and increase account management to increase sales.

Each of these market barriers in roles, rules, and tools was an opportunity for the TradePro Connect platform to improve customer and service provider experiences. Unfortunately, in the work taken to develop the platform and address these barriers, new challenges arose.

Challenges and Activities

In the efforts to tackle these barriers and find solutions, the TradePro Connect project faced challenges to program development, platform functionality, and service provider engagement that impacted the intended solutions described in the previous Addressing Barriers section. It proved difficult to launch TradePro Connect with four programs while also trying to attract customers and service providers. The result was low rates of customers, service providers, projects, and programs on the platform. Platform functionality also experienced challenges due to integration hurdles resulting from low user rates and efforts to meet multiple utility needs in a single solution. Lastly, it was challenging to engage service providers to join TradePro Connect without defined participating programs and customer project needs; once service providers were signed up it became difficult to onboard more service providers at scale.

Roles

Some obstacles related to barriers with participant bandwidth and organizational operations included the following.

Challenge: Diversity of Utility Needs

Existing functionality in the service procurement platform was not originally developed for the complexities of working with multiple utility programs. TradePro Connect had to find a balance between the diverse needs of multiple utility deployments at scale while keeping the service provider experience simple. The initial design called for a consistent landing page for all customers to access Manage Your Power, with project-type options based on user input such as zip code, address, or utility administrator. This design created a consistent experience for customers. However, it also required that sponsoring utilities conform to both the style guidelines, and narrative preset on Manage Your Power. Neither of the two California deployments met these criteria since both sponsors required unique language and customer input criteria.

Actions to Overcome

To meet this challenge and maintain a low deployment cost and consistency in user experience, Manage Your Power was deployed as a brand or reskin to any third-party, such as a utility. The overall workflow stayed the same, allowing for an alternative narrative while keeping the customer experience intact. The customer experience was kept simple enough that customers could search for service providers without needing a deep understanding of the technology. Similarly, the service provider experience was kept simple so that they could easily filter for jobs best suited for them. However, it proved difficult to find the balance between providing enough information for service providers to make an informed decision, but not too much, which might overwhelm them or encourage cherry-picking. Similar to the SOMAH program, participating utilities or institutions required that service providers and customers sign up for TradePro Connect to participate in the program and provide adequate training and support, both before and during the bid process. Utility engagement and commitment to offering trainings, marketing resources, and requirements to use the platform for potential programs were crucial for overcoming this challenge.

Challenge: Overambitious Number of Initial Use Cases

Four use cases were initially planned for TradePro Connect. Each use case required individual product and deployment requirements to reduce the possibility of overlap, and it became difficult to develop and implement deployment logistics for four use cases simultaneously. Furthermore, after implementation was attempted, it became clear that the four uses cases offered by TradePro Connect did not meet the needs of the market.

Actions to Overcome

In Fall 2019 none of the four uses had been employed so the project team decided to focus on small- and medium-sized businesses. This resulted in a targeted smart thermostat promotional offering. This effort to focus on one use case contributed to the project's service provider and project goals, which are further discussed in CHAPTER 3: Project Results.

Challenge: User Enrollment

Enrolling service providers onto TradePro Connect required both a thoughtful plan and follow-up. Service providers would not enroll in a platform that did not already have a large backlog of customer interest. Similarly, customers would not engage with a platform that did not already have a selection of service providers from which to choose. Additionally, attracting customers to seek out service providers via a utility program required marketing and outreach. An effective advertisement campaign could navigate both business and residential customers through the decision-making process by addressing their priorities and providing a solution that meets their needs. In the two deployments of TradePro Connect, marketing resources were limited, reducing market awareness and ultimately market interest in the resource.

Actions to Overcome

To spur interest, CEC funds were redeployed to offer customers low- or no-cost automated demand response-compliant thermostats and on-bill financing application support. These offers resonated with small- and medium-sized businesses and municipal organizations and were marketed through these channels to thousands of organizations across California. Unfortunately, promotional funds were limited and ultimately capped the engagement to 25 to 100 organizations. This effort contributed to the project's service provider and project goals, which are further discussed in CHAPTER 3: Project Results.

Rules

Various procurement processes and guidelines introduced obstacles.

Challenge: Reliance on Utility and Community Choice Aggregator Support

Many of TradePro Connect's performance targets and metrics were based on utility or community choice aggregator (CCA) participation in TradePro Connect. Customers and service providers were required to use the platform to become eligible for incentives. However, during the project's lifetime external forces put pressure on these partnerships. For example, in December 2018 the California Public Utilities Commission (CPUC) changed the baseline for lighting measures, resulting in the loss of Marin Clean Energy's (MCE) program on TradePro

Connect. MCE was unable to identify additional cost-effective measures or programs for TradePro Connect since MCE customers were located in PG&E territory and MCE could only offer energy efficiency programs that were not provided by PG&E. Additionally, PG&E expected to launch TradePro Connect to expand its Electric Vehicle Installer network, but competing priorities at the investor-owned utility prevented the launch. The numerous project starts and stops resulted in adoption struggles.

Actions to Overcome

To demonstrate the usability and functionality of the platform without a utility or CCA, budget was reallocated to offer smart thermostats to California customers. To receive the offer, customers and service providers were required to use TradePro Connect. This sample show-cased the functionality of the platform and increased the number of projects and transactions on TradePro Connect. This effort contributed to meeting service provider and project goals, further discussed in the CHAPTER 3: Project Results.

Challenge: Developing a Service Provider Value Proposition

The primary reason service providers enroll in a services marketplace, list their business in the phone book, or brand their vehicles with logos and contact information is to alert the market to their service offerings. The expectation is that market awareness will lead to business opportunities. Other digital service marketplaces recruit service providers and customers simultaneously through large advertisement campaigns that signal to both parties that demand exists. Through research, the team learned that service providers had been offered similar platforms in the past, which felt duplicative and did not meet their needs, and ultimately went out of use within a few months. Service providers were hesitant to use TradePro Connect since they saw it as "just another platform" that had yet to prove its value.

Utility programs are generally less publicized and require the use of financial incentives to attract both customers and service providers to interact in their program channels. The platform became more valuable when the listing was framed to show a service provider's ability to secure utility incentives and provide quality service.

Programs joined TradePro Connect in California with mixed results. For more information, please see CHAPTER 3: Project Results.

- At MCE, the program stalled because regulatory changes caused intended measures to become cost ineffective, which canceled recruitment efforts.

- The SCE Auto-DR program competed with other automated demand response enrollment channels, discouraging service providers from focusing efforts on any one channel.

- SOMAH experienced no hesitancy from service providers as access to the SOMAH program benefits required customers to employ program-enrolled service providers.

Actions to Overcome

To build a pool of service providers in California without a defined program, CEC funds offered small- and medium-sized businesses and municipal governments low-cost and automated

demand response-compliant thermostats. These resources demonstrated to service providers that there was a channel to market their businesses to customers seeking out specific services. This also prepared TradePro Connect for the opportunity to immediately launch service networks for CCAs, regional energy networks, investor-owned utilities, and other administrators in California.

Tools

The initial technology solution encountered obstacles and needs requiring revision of the original functionality.

Challenge: Pre-Existing Service Provider and Trade Ally Channels

It is complicated for the market to establish a secondary service provider or trade ally channel within existing utility programs. TradePro Connect launched two programs in California where pre-existing trade ally channels were already established. Recruiting service providers into an alternate network is not intuitive and created confusion. Service providers demonstrated hesitancy in the SCE Auto-DR program where an existing trade ally network already existed, while another program, SOMAH, took a different approach and migrated its network to TradePro Connect as a requirement to continue program participation.

Actions to Overcome

To improve continuity within utility program offerings, TradePro Connect's Knowledge Center compiled program web links and information on all programs available to service providers from a sponsoring utility and, where applicable, offered single sign-ins when exiting TradePro Connect to other utility programs. Ultimately, service providers preferred a single channel to engage utilities when assisting customers through the rebate and DR processes.

Challenge: Service Provider Onboarding at Scale

Once the value proposition was determined, the next challenge was to determine how to onboard service providers at scale to make the platform useful to customers searching for a provider that can best meet their needs. Each new program launch required a new pool of service providers in the area, with potential service providers varying significantly by service, product, utility program, and location. The platform required enough qualified service providers to ensure that the service territory was covered, and that any customer requesting a bid in California would have at least one option. Over the project's lifetime of 18 months, the support team determined the best strategies for onboarding service providers by trial and error. Each option, including a recording, standing live trainings, and one-on-one meetings, had its own benefits and challenges.

Actions to Overcome

Three solutions were tested to meet these scaling needs:

- The project team increased its impact by working upstream (when possible) to present and sell the value of TradePro Connect. This included engagement and demos for

distributors and wholesalers. This top-down directive helped to secure buy-in from service providers.

- The project team enhanced the service provider experience on the platform with courtesy profile configuration. Previously, a system administrator invited the service provider to create its own account on the TradePro Connect network. A service provider would follow the link to create the account then navigate through several tabs to populate company information (including company bio, account holder details, and company location). Instead, service providers received their invitation and direction via email, reset their password to claim their profile, and quickly reviewed the populated information for accuracy.

- The team developed documentation available on TradePro Connect's Knowledge Center to facilitate service provider navigation through the TradePro Connect platform.

Challenge: Simultaneous Integration of Multiple Platforms

The TradePro Connect project intended to integrate multiple platforms to provide one solution that addressed common procurement challenges. Integrations were to occur as programs signed up to use TradePro Connect, and as customers and service providers interacted with the platform. However, given the program development challenges as previously mentioned, the platform did not have adequate activity from users (customers, service providers, and programs) to fully integrate all platforms. For example, ecomedes offered a directory for products within a certain category, but because no programs were participating in TradePro Connect or identifying certain products to choose from, the integration did not occur. Additionally, each platform had its own product development roadmap, priorities, and timelines that did not always prioritize TradePro Connect needs, which caused implementation delays.

Actions to Overcome

Efforts were made to revise timelines and roadmaps and generate sufficient activity (via a thermostat offering), but the requisite business imperatives were inadequate to fully overcome this challenge.

Technical Advisory Committee

Before project launch, the project team knew that a diverse set of stakeholders was necessary to help address known barriers and challenges to procurement. A technical advisory committee (TAC) was formed in August 2018 to provide guidance on scope and recommendations on information dissemination, market pathways, and commercialization strategies. The following companies and organizations were members:

- Qmerit
- ecomedes
- ASWB Engineering
- PG&E
- Local Government Commission
- National Electrical Contractors Association (NECA)

- International Brotherhood of Electrical Workers (IBEW)
- Labor Management Cooperation Committee (LMCC)
- Sheet Metal Workers Local 104
- The Office of Planning and Research (OPR)
- Vermont Energy Investment Corporation (VEIC)

The first TAC meeting was held on August 23, 2018, to provide an overview of the project. After reviewing the scope of the project, goals, and timelines, Energy Solutions identified the following focus areas for future TAC input:

1. Targeted Markets
2. Market Knowledge Applications
3. Product and Service Recommendations
4. Project Performance Goals and Metrics

During the meeting, TAC members provided feedback on the project's performance goals. The TAC recommended updating the project's project performance goals from "enroll a minimum of 100 contractor organizations on the platform, directing at least of 30 percent of the jobs to small, minority, women, and/or disabled veteran businesses" to "enroll a minimum of 100 contractor organizations on the platform, directing 30 of the jobs to small, minority, women, and/or disabled veteran businesses."

The final TAC meeting was held on November 13, 2019. The project team provided an update on existing programs (SOMAH and SCE Auto-DR) and the thermostat promotion and asked for feedback on how to encourage more program and project participation since the project was not expected to meet its goals. There was no specific feedback on how to encourage further participation though members (particularly from workforce training and leadership organizations) highlighted the need to emphasize safety, particularly fire danger and electric faults for service providers and customers. Organizations also recommended additional scope to double check contractor license standings and insurance with boards, and worker compensation organizations before allowing applicants to participate in a program on TradePro Connect.

All TAC members acknowledged that the timing of customer and service provider engagement was essential and further training of customers, service providers, and utilities was critical for understanding the importance of safety and qualified work through certifications, background checks, and trainings. Generally, the TAC was supportive of the platform as a way to build awareness around the importance of safety and properly vetted, certified, and trained service providers.

CHAPTER 3:
Project Results

Summary of Project Results

A portion of the stated goals for this project was achieved, resulting in expanded understanding of the DER program landscape and service provider business drivers. The barriers described in Chapter 3, Known Barriers proved difficult to overcome, and significant new barriers emerged during project execution. This chapter describes the project results, project delivery, new barriers, lessons learned, and opportunities for additional research.

Project Performance Goals and Targets

The following table shows the status of the project's performance goals and targets as of August 2021.

While partial achievement of some performance goals was possible, reaching all performance goals was not feasible within the project timeline and under current developmental constraints.

Table 2: Performance Goals

Performance Goals	Status	Justification
Configure, integrate, and deploy four DER programs on the TradePro Connect platform (thermostats, lighting, HVAC, and solar)	Partially achieved (50 percent)	Two DER programs were deployed: the SCE Auto-DR/Thermostats, and Center for Sustainable Energy – Solar on Multifamily Affordable Housing (SOMAH) programs were configured, integrated, and deployed. One other program was initiated but later abandoned and the platform was included in numerous proposals, some of which made it to the final pricing stage.
Incorporate a DER product strategy in the recipient's GPO to promote best-in-class DER solutions over standard practice items	Not achieved	Efforts to incorporate a procurement initiative from Group 3 were explored, but project activity was insufficient to warrant integrating GPO functionality at that point.
Enroll a minimum of 100 contractors on the platform, directing at least 30 projects to small, disabled veteran, minority, LGBT and/or women business enterprises	84 percent achieved (84 service providers enrolled); no DVBE projects were recorded	Contractor enrollment largely came via the SOMAH project, which has no supplier diversity requirement. Service providers were queried to see if any met requirements for DVBE registration; only one appeared to meet that standard but had no active projects on the platform.

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Performance Goals	Status	Justification
Implement at least 50 projects during the 18-month project period, generating $2 million of lifetime energy savings across a multitude of sectors, end uses, and services	68 percent achieved (28 projects completed; 7 active projects)	Thermostat installations comprised the majority of projects; lifetime energy savings were not calculated.
Achieve an average customer satisfaction rating of 4.5 out of 5	Not achieved	Customer enrollment was insufficient to warrant a survey since 28 projects completed were from the same service provider.
Demonstrate and document methods to use utility advanced metering infrastructure and manufacturer monitoring and fault detection and diagnostics to optimize operations and right-time maintenance on a minimum of two sites	Not achieved	28 projects were thermostats and solar (SOMAH), both of which did not have a need for fault detection diagnostic services.

Project Delivery

A prototype was executed with participation from service providers in the SCE Auto-DR and SOMAH programs. The design offered customers a maximum of three service provider bids, and the SCE Auto-DR program also required that information on project closeout be entered.

To receive multiple offers, customers went to their branded Manage Your Power website and selected a project type. They chose from a list of suggested service providers and completed a form describing project needs and site and contact information, to be submitted to selected providers. A successful submission produced a confirmation page but no email. As service providers uploaded bids, the customer received bid update emails, but could not track whether a specific service provider had either seen their request or prompted them if a response seemed to be taking longer than expected.

The three-bid requirement became an obstacle for automated demand response service providers that did not see a high volume of new customers so were reluctant to recommend a platform that might expose existing customers to competitors. In response, a thermostat promotion was offered. Customers were attracted to the $300 incentive offer and valued the ability to pick from a shortened list of local providers. However, some territories had limited service provider coverage, so only one option was available.

The prototype system operated successfully for use cases where contractor credentials were easily defined and program managers were accountable for engaging customers and service providers, as shown in the SOMAH program. Additional features to ensure that service providers received sufficient information each time they offered a bid, were required to drive wider adoption of the system by utility demand side management programs and scaled to realize a competitive advantage.

Deployed Programs

After the customer interface Manage Your Power was configured, an initial selection of DER programs was deployed on the platform. Service providers were invited to join the TradePro Connect network to enroll in the programs.

Solar on Multifamily Affordable Housing

The Solar on Multifamily Affordable Housing (SOMAH) program operated by the Center for Sustainable Energy provides financial incentives for installing PV energy systems on multifamily affordable housing in California. Qualifying customers are defined as any retail electric distribution customer of PG&E, SCE, SDG&E, PacifiCorp, or Liberty Utilities Company, which owns or manages property that follows criteria identified by SOMAH. The SOMAH program is overseen by the CPUC and provides incentives to qualifying affordable housing within the service territories of those investor-owned utilities (IOU). aforementioned utilities. The SOMAH program is mandated to provide incentives for the installation and interconnection of at least 300MW megawatts of solar generating capacity on qualified multifamily affordable housing statewide by December 21, 2030.

SOMAH offers customers two tracks to access incentives. Track B customers had already identified a contractor with whom they would like to work and did not need help assessing their solar potential or getting multiple bids through the program. Track A customers were those who desired support and bids and were directed to the Manage Your Power portal. In July 2019, the SOMAH Online Bidding Tool was deployed in TradePro Connect. A service provider had to be an appropriately licensed California contractor in accordance with rules and regulations adopted by the California Contractors State Licensing Board (CSLB) to qualify to participate in the SOMAH program. Solar installation service providers had to have an active A, B, C-10, or C-46 license for photovoltaic systems. During the application review process, the Center for Sustainable Energy (the SOMAH program administrator) verified that the solar contractor had an active license with the CSLB. The Center for Sustainable Energy then sent company user account requests to Energy Solutions on a rolling basis. Requests included company name, CSLB license number, username, and user email. Once onboarded to TradePro Connect, service providers were eligible to directly apply for SOMAH incentives on behalf of their customers using the PowerClerk online application tool after notification of a winning a bid. The SOMAH program did not feature online rebate claim submissions through TradePro Connect. To leverage financial incentives for qualifying customers, qualifying service providers must have contacted the Center for Sustainable Energy upon receiving notification of a winning bid and following the incentive application process as instructed.

Southern California Edison Automated Demand Response

Automated demand response (Auto-DR) customers and service providers with a peak load under 500 kW face barriers when purchasing and installing Auto-DR enabled equipment. Customers interested in Auto-DR projects seek the SCE Auto-DR program for recommenda-tions; but SCE's vendor neutrality requirements do not allow Auto-DR program staff to direct customers to specific contractors. Likewise, service providers that already provide energy efficiency services to smaller customers may not know about OpenAuto-DR certified products.

The result is that some Auto-DR capable equipment installed in the field is never activated to participate in DR programs. These sites need to be connected with qualified Auto-DR service providers to complete projects.

SCE Auto-DR was deployed on TradePro Connect in June 2019 to overcome these challenges and streamline procurement of Auto-DR solutions that would help scale adoption of Auto-DR technologies in the small- and medium-sized business market. TradePro Connect was designed to let customers take control of the procurement experience, feel empowered to make educated decisions, find the right OpenAuto-DR-certified products and contractor services, and ultimately break through the logistical barriers that often prevent them from completing projects. For service providers already engaged by customers to implement energy efficiency projects, this functionality would maximize the value delivered to customers from OpenAuto-DR equipment and leverage Title 24 Auto-DR requirements that increase SCE's connected Auto-DR load.

Program participation requirements for service providers were to provide a CSLB license number and respond to the statement, "Auto-DR controls often have complex installation and configuration requirements. Please check the box below to confirm you are experienced working with these controls. If you are unable to check the box, please contact the TradePro Connect team at help@tradeproconnect.com to explore training opportunities."

Thermostat Promotion

To demonstrate how a project could move successfully through the TradePro Connect platform, a thermostat promotion was launched in the fourth quarter of 2019. This attracted the attention of customers by offering $300 off each thermostat (up to four per site, using a promotion fund total of $30,000). To qualify, customer projects had to be submitted through the generic customer-facing Manage Your Power and closed out on the TradePro Connect platform. As of August 13, 2021, this promotion added an additional 13 customer projects, totaling 33 thermostats and consuming $9,900 in promotion funds.

While this effort demonstrated customer interest and willingness to engage with the platform, it did not succeed in attracting additional projects; only a single service provider took advantage of it. The promotion was not conceived as a fully realized program, but rather as a means of creating traction on the platform to generate momentum for further program offerings and project opportunities. The lessons learned from this effort are discussed in the following section.

Non-Deployed Programs, Proposals, and Explorations

Marin Clean Energy

In October 2018, Manage Your Power was commissioned by Marin Clean Energy (MCE), a community choice aggregator (CCA) serving 34 communities in Marin, Napa, Contra Costa, and Solano counties, to facilitate the specification, procurement, and installation of lighting equipment in facilities in the commercial, industrial, public, and agricultural sectors. To participate in the program, service providers were required to request an invitation or otherwise be invited to join the TradePro Connect network and provide required

documentation including business licenses, insurance, and training certificates. Upon review and approval by program staff, the service provider was provided login credentials for the TradePro Connect platform.

In December 2018, however, the CPUC changed the baseline for many lighting measures that MCE was interested in offering, using TradePro Connect. That resulted in lesser energy savings, which made the measures non-cost effective. Consequently, in Spring 2019 MCE decided not to pursue using TradePro Connect.

Proposals

TradePro Connect was included as a feature in multiple proposals for new work. It was included in the bid for PG&E's Cannabis Energy Efficiency Development Program (which got to the final pricing stage), as well as California statewide bids for HVAC and water heaters. The platform was promoted as a tool that could apply to multiple end-uses, but unfortunately those proposals were not selected for implementation. Several energy efficiency program administrators in the Northeast explored the platform for EVs, which was denied by regulators. No CEC funds were used in that effort.

Explorations

On-bill financing is a utility financing mechanism that allows customers to purchase and install energy efficiency measures with zero interest, fees, or costs. Utilities provide loans to customers that are paid through energy savings shown in their utility bills. On-bill financing was identified as a non-utility branded program in June 2019 that could bring more project and transactions to TradePro Connect. A non-utility branded program meant that any customer in a California service territory where on-bill financing is offered could use TradePro Connect to find qualified service providers and on-bill financing application assistance. Energy Solutions presented to four third-party potential participants during Summer 2019 about this opportunity, including TL lighting, advanced lighting and electrical services, ILP/Green Creative, and U.S. Energy Recovery. However, as this mechanism was explored for TradePro Connect, the complexity of financial institutions became too burdensome for the deployment needs and timeframes of the TradePro Connect project. It was also difficult to gain service provider support and enthusiasm so was ultimately dropped from this effort.

Participant Feedback

For both SOMAH and the thermostat promotion, customers valued the opportunity to get a short list of bids from qualified service providers. Specific to the thermostat promotion, both customers and service providers found the $300 thermostat incentive attractive as an introduction to the platform.

Over the course of the project, other unexpected barriers made it significantly more difficult to achieve performance goals. For example, customers did not always provide adequate details of their projects and looked to service providers for support in filling out their project descriptions correctly. This often triggered a cumbersome process of back-and-forth communication to clarify project scopes. Additionally, communications via email were occasionally flagged as spam, therefore never making it to customers' inboxes.

Service providers also expressed skepticism about enrolling on yet another new platform (with comments like, "Is this one of those things where it's hot for a few months then it dies?"). This kind of pre-existing burnout had not been anticipated. Another feature that did not operate as anticipated was bidding without a site visit. While bidding on projects just based on customer information (removing the need for on-site visits) was initially considered a useful functionality, after receiving service provider feedback it became clear that it was necessary for service providers to go on-site to complete bidding for some products and complex projects, such as HVAC services, which made costs prohibitive.

Lessons Learned

The lessons learned are categorized here in the following sections: platform/product offerings, program offerings, market engagement, and customer engagement. Examples and recommendations for future efforts are provided where applicable.

Platform and Product Offerings

1. *Focus On First Use Case And Include Market Actor Testing:* Initially, the project sought to create multiple use cases with different product offerings at the same time. However, each use case and program had a different set of product requirements and deployment logistics that had to be both considered and tested within the market-place. When building a marketplace, all users and use cases cannot be created and deployed at once. Recommendations for future efforts include defining strategies for one technology and conducting market actor testing to develop proven use cases and then deploy at scale.

2. *Simplify the Platform:* Multiple software platforms were coordinated to create TradePro Connect. These platforms directed service providers and customers to different web-sites and portals. Service providers were directed to the TradePro Connect website to log into Qmerit, and customers were directed to Manage Your Power to submit bids for work and evaluate projects and service providers. Lacking a utility program-facing website that could direct service providers and customers as needed, this created confusion and future efforts should be directed toward consolidating the Manage Your Power and TradePro Connect brand and websites.

3. *Integrate One Platform at a Time:* TradePro Connect integrated multiple platforms from companies that had pre-existing clients, programs, and priorities. Competing needs and interests made it difficult to make changes to these platforms to suit the needs of TradePro Connect. Rather than attempting to integrate multiple platforms at once, focusing on one integration before introducing more complexity would make coordinating priorities manageable.

Program Offerings

1. *Finalize a Plan With Partners That Ensure a Good Channel Strategy:* The project's initial growth strategy relied heavily on pursuing utility and CCA participation to scale the platform, at the expense of developing first use cases. A stronger value

proposition was needed to demonstrate the platform's usefulness for utilities to ensure their commitment to participating in TradePro Connect. This would also have mitigated the impact of external factors, such as changes to utility leadership and priorities, which can be common within large organizations.

2. *Be Aware of Interactions When Growing Both Customers and Service Providers:* The growth strategy relied on significant utility participation in TradePro Connect to drive customers, projects, and service providers to the platform quickly. The project's experience of significant barriers to utility program participation diminished the value proposition for service providers: without program-driven customer projects on which to bid, it became difficult to attract service providers to sign up for TradePro Connect. Similarly, without a robust existing contractor pool it was difficult to attract additional utilities and customer programs to the platform. While the project team ultimately decided to onboard service providers first, timing was critical to ensure neither party was left waiting long. On the customer side of this process, that meant the timeline had to accommodate market designs, cobranding approvals if necessary, and campaign rollout. A growth strategy aimed at getting either service providers or customers to join the platform at the start of the project, instead of pursuing both groups at the same time, would have been more effective.

3. *Start With One Program and Then Scale:* One goal of this project was to execute four different programs on the TradePro Connect platform. These different programs were anticipated to serve opportunities through partnerships with utilities/CCAs, which did not happen as expected. Without these partnerships, programs that were identified to garner interest in the platform were not tested at the market-level. Also, programs cannot be created and deployed at once as program requirements and deployment logistics can be more complicated than anticipated. Multiple conflicting timelines for awards and competitive solicitations also made it difficult to scale due to lack of economies of scale. Similar to identifying one use case and then scaling, one program should be developed and tested at the market and then scaled rather than simultaneously attempting multiple programs

4. *Focus on Plug-And-Play Products Rather Than Those Requiring Customization or Engineering Support:* Projects that may involve multiple service types (such as electrical upgrades, plumbing, or building structure modifications) add complexity to the bidding process. DER products (such as solar-plus-storage) that are more easily packaged lend themselves to streamlined procurement.

5. *Consider the Added Complexity of Incentive Programs:* Incentive program application and process may be hosted on another platform, introducing yet another piece to this progress (internal system + TradePro Connect + incentive program). An example of this is SCE's Auto-DR program that requires that applications be submitted through its online application tool. The incentive program process may also require reservation or eligibility approval prior to installation, delaying the project. The utility review process may be lengthy, and the contractor must monitor the project for it to be actionable. The incentive program process may require the customer to initiate; it was unclear

who is responsible for driving the incentive application forward as the contractor may have been granted access to plug-in technical details but may not want to stay involved in seeing it through to completion as the incentive may require the customer to be the recipient. This detail affects the service providers' incentive.

Market Engagement (Training, Participation, and Engagement to Succeed)

1. *Use an Upstream Approach to Access and Engage Contractor Networks:* It is more efficient and scalable to demonstrate the value of TradePro Connect and obtain buy in with upstream market players, such as manufacturers and distributors, rather than downstream market players on a one-by-one contractor basis. Upstream market players also often have established contractor networks that meet quality levels for service and training.

2. *Ensure the Value Proposition to Engage and Participate Is Compelling:* Acknowledge the contractor is already in business, managing their own leads and active projects with their own internal systems, prior to being introduced to TradePro Connect. Service providers are already saturated with platforms that took time to learn and onboard but did not add value to their business. The value proposition to learn, onboard, and monitor another platform must be compelling.

3. *Simplify the Contractor Platform Onboarding Experience:* During the initial stages of the project, the service provider's onboarding process to TradePro Connect required creating an account, completing a company profile (company name, website [optional], company overview [optional], primary contact details, address, and service radius), and completing program credential requirements such as uploading a California Contractors State License Board C-20 HVAC contractor license. Service providers received a detailed user manual with screenshots and clear instructions for platform navigation. The contractor experience to complete this process was moderately lengthy and required great attention to detail to navigate the different platform tabs that access the different profile and platform sections. As the project progressed and more user feedback was gathered, platform functionality was expanded to support bulk contractor accounts. This simplified the onboarding process for service providers, which could now simply reset the password to claim the account, click through their profile to confirm that details were correct, and add any required program credentials.

4. *Offer Comprehensive, User-Friendly, and Self-Guided Resources:* During the initial stages of the project, it was assumed that standing biweekly webinars would be required to deliver consistent and thorough onboarding experiences for service providers. It was quickly clear that this would be time consuming, and that busy service providers might therefore not be interested in attending. The project team modified this approach and developed comprehensive, user-friendly, self-guided resources that service providers could read on their own and refer to at any later time. Two resources were created to support contractor understanding, navigation, and use of the TradePro Connect platform: the introduction and bid navigation manuals.

5. *Consider Market Realities, Drivers, and Trends:* It was assumed that service providers would be interested in bidding on and servicing TradePro Connect projects. However, in addition to TradePro Connect, service providers had   active projects, projects in the pipeline, resource management issues, and other competing priorities. Demand for contractor services also have peak and slow seasons. Some service providers will be too busy to take on new customers, or to introduce new platforms or processes to their business operations. Service providers may also specialize in or decline certain project types. One example of this was a contractor that declined to bid on a chain restaurant location, citing "We don't do restaurants." Project size also plays a factor as contractor interest will only occur at a specific project size.

6. *Consider the Contractor Experience:* The TradePro Connect bid and project workflows should require a minimum number of administrative steps to advance bids and projects. It was critical that the workflow design not duplicate service providers' own internal systems. A mobile platform for TradePro Connect should also be accessible since service providers spend more time in the field than at computers in their offices.

7. *Consider Contractor Risk Tolerance That Varies by Project Type:* Risk tolerance may dictate a service provider's decision to accept or decline bidding, depending on the type of project or service offering. For example, certain job types require work on the main service panel or other existing structures or systems, introducing additional risks. This can translate to a loss of project velocity and increased costs, which are business risks that service providers naturally prefer to mitigate.

8. *Leverage Brand Recognition That Supports Customer Confidence:* Co-brand and offer "Manage Your Power" through customer utility programs to add legitimacy. This was more effective than introducing and advertising Manage Your Power as a stand-alone platform.

9. Consider the customers' level of knowledge. Customers navigating to the Manage Your Power site fill out intake questions to which they might not have the answers. Questions should be framed in a manner that customers of all technical knowledge levels may answer. The challenge here is balancing a simplified customer experience and ensuring the contractor has enough information to bid. The current one-size-fits-all template with an open text field to insert comments is insufficient as project needs at different sites will vary.

10. Consider variable customer needs. The Manage Your Power platform was set up to intake one project request site at a time. This design did not work efficiently for customers who managed property portfolios. One customer who managed more than 10 chain restaurant locations had to repeat the process one by one.

11. Consider customer preferences and demand. Customers who have been in business for a while likely have existing and longstanding relationships with service providers. These customers will be highly unlikely to use Manage Your Power.

Successes with SOMAH

While this project experienced many barriers to successfully achieving its stated performance goals, the SOMAH program did succeed in connecting customers with service providers that met their needs. While SOMAH's goals were to use just a portion of the platform's functionality (it did not employ product directory or GPO functionality), its successes can help inform how future programs can be effective when using the platform. Reasons included:

1. *Value Proposition*. To receive the incentive, service providers and customers had to sign up with TradePro Connect.

2. *Simplified User Experience*. It was easy for customers to enter project requests in the SOMAH-branded Manage Your Power website, and for service providers to quickly upload their credentials in TradePro Connect.

3. *TradePro Connect as a Condition for Eligibility*. Service providers were required to join TradePro Connect to be eligible for participation in the SOMAH program. For service providers to enroll in TradePro Connect, they were required to undergo training with the Center for Sustainable Energy, the program administrator.

4. *User-Friendly Website*. SOMAH had a user-friendly website that provided a link to SOMAH's branded Manage Your Power web page. They also had a dedicated marketing team that helped to brand the website and market the effort.

Additional Research Needed

The following is a set of topics worth further research.

Technology Fit

A wide range of DER products exists, from automated demand response-enabled thermostats to EV charging stations. Each has a unique supply chain and service delivery model. Research into the nature and operation of specific product markets would help identify the best opportunities for a program implementing TradePro Connect.

Customer Origination and Value Proposition Strategies

TradePro Connect was developed with a set of rules and requirements intended to provide contractor credential management and meet other needs of utilities and program administrators such as reporting and participation dashboards. Additional effort is needed to strengthen the customer value proposition and outreach strategy. The success of TradePro Connect (and any service professional digital warehouse), relies on a strong lead generation mechanism that draws customers to the platform. One way to achieve this may be for programs to require TradePro Connect registration by service providers, as SOMAH did. Research into the impact of this requirement would help refine the value proposition.

Additional Platform Functionality

Improvements to Existing Functionality

Offering service providers the ability to upload information for multiple projects at one time would improve the user experience and encourage greater participation. For customers considering a list of service providers, the ability to filter the list based on desired criteria (such as years of experience, diversity certifications, program experiences or the number of projects delivered) would speed the selection process. For program administrators, the ability to configure and view a dashboard displaying key program metrics (including the number of trade allies that have initiated or completed profiles for a program), or view and configure a dashboard with contact information and program information for each trade ally, would improve program management and results tracking. Program administrators would also benefit from a way to send out one communication to all participating service providers (for example, emails and text messages) about program updates, alerts, or changes. This is currently done automatically, and a streamlined approach would be much more cost-effective. Careful research into user requirements and online behavior would be needed to assess the costs and benefits associated with these or similar functional improvements.

Integration With an Incentive Processing Application

Midstream utility programs require software such as Energy Solutions' Iris system to accept and process requests for rebates and incentives. Integrating this capability with a TradePro Connect-enabled program would provide a seamless experience for service providers and enhance their offering by taking an administrative burden off of end-use customers. Another advantage of this integration would be built-in "model matching" allowing service providers to enter their supplier's product number and automatically know the rebate level for which that product qualifies. Presently, service providers must make an effort to determine if a specified product or product category (identified by configuration, color, or optional features) can be found on a utility list of incentivized technologies.

Increase Visibility of Incentive Programs

An incentive clearinghouse capability, similar to that envisioned for the Technology and Equipment for Clean Heating initiative could enhance TradePro Connect by identifying multiple programs for which the project might qualify.[2] This could direct users to an appropriate program link or help them evaluate and choose between potential program options, or even help layer multiple incentives, where permitted, that maximize the benefit of using the TradePro Connect platform for procurement.

Integration With Third Parties for Contractor Training in Knowledge Center

Utility programs often hire third party vendors to conduct training for service providers via live webinars. TradePro Connect's Knowledge Center allows static materials to be uploaded for

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[2] California Public Utilities Commission record of proposed decision outlining the Technology and Equipment for Clean Heating initiative, which is a market transformation program designed to accelerate the adoption of low-emission space and water heating equipment technologies in new and existing residential buildings to advance California's decarbonization strategy: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M326/K933/326933578.PDF

service providers, but it is not currently possible to host live trainings or demos on the platform. This additional functionality would centralize the experience for service providers and provide an even greater value proposition to join the platform.

CHAPTER 4: Technology/Knowledge/Market Transfer Activities

A primary benefit of the EPIC program is the technology- and knowledge-sharing among the CEC, utility and program administrator clients, and the industry. The following section summarizes activities related to sharing technology and knowledge about the TradePro Connect platform.

Market Adoption

The project primarily targeted utility efficiency programs, both as support services and as the primary way to generate energy savings. As part of the market adoption phase, the subcontractor, non-profit Local Government Commission interviewed local governments to determine their biggest services procurement barriers and whether TradePro Connect would be a good fit for overcoming those barriers. Key findings are summarized in APPENDIX D: Local Government Commission Memo, which includes the memorandum from the Local Government Commission to target audiences.

1. Limited technical capacity of staff remains a barrier to procuring advanced energy products and services.

2. Proofs of concept for new energy products are needed to enable widescale adoption.

3. Plans such as Capital Improvement Plans, Climate Action Plans, General Plans, and other local plans, dictate procurement requirements.

4. Many agencies are pursuing bulk procurement and cooperative purchasing agreements.

5. Most local agencies are using bid platforms (like PlanetBids or BidSync) to meet their basic needs.

This research helped the project team understand that barriers fell into three categories: roles, rules, and tools.

- Roles — Lack of staff bandwidth or a clear organizational chart related to services procurement

- Rules — Need for organizational procurement guidelines, or their refinement

- Tools — Need for technology solutions and training for how to use existing tools

The near-term and mid-term markets included utilities, institutional customers, and service providers. Since California accounts for about 5 percent of utility-scale electricity net generation in the United States, this is a significant potential market (EIA 2021). The platform and its subsequent research have been used by utilities and institutional customers considering their

program procurement. They used the platform to ensure reliability, transparency, and safety in their programs. Service providers also used the platform and its information to understand utility or institutional program requirements. If the platform were scaled, it could also be used as a tool for contractor networks and GPOs. According to the Contractors State License Board, there is a potential market of 290,000 service providers (CSLB 2021).

Technology

While the platform was not fully executed as initially envisioned, design iterations of the platform were achieved during the TradePro Connect project. Technology readiness Level 6 was achieved during this project because a prototype system was tested in a relevant environment (U.S. Department of Energy 2011). For example, the project was first considered as an implementation exclusive to a CCA program (Marin Clean Energy), but when DER technology savings changed, this program was no longer viable. Next, multiple California statewide and local programs were considered, but ultimately the pay-for-performance structure and savings goals made these programs too risky to pursue. The platform was incorporated in proposals for multiple California statewide programs, but those were not awarded to Energy Solutions. The thermostat offering (Thermostat Promotion in Chapter 3) was used as an effort to redirect resources and try a new strategy.

While there was not enough platform activity to warrant solicitation of user feedback, discussions with local governments helped the team understand and assess service procurement barriers (refer to the previous Market Adoption section in this chapter). The roles, rules, and tools framework led to a three-part webinar training series as part of Empower Procurement (Empower Procurement 2021).

Scaling and Lessons Learned

The original objective, described above in Chapter 3, Program Offerings, was to simultaneously execute four different programs on the TradePro Connect platform. Since program requirements and deployment logistics can be complicated, it is important to start with one program to understand the market and its nuances. Furthermore, it became clear that a barrier to commercialization was the causality dilemma: To encourage service providers to join the platform, the platform needs customers, but customers have no use for the platform if there are not yet available service providers to choose from.

Another barrier to commercialization was the difficulty of forecasting savings from use of the portal. Utilities require accurate savings forecasts; without this, the potential use of the platform decreases. Scaling the platform would have required a strategy to address these issues and expand by gradually adding new clients and DER technologies.

While elements of this platform will be deployed at scale, the entire platform is not expected to be fully commercialized, making a cost estimate at scale difficult to determine.

Technical Advisory Committee

The TAC, described in Chapter 2, included a diverse array of companies and organizations that helped disseminate awareness to both the industry and users. Members of the committee

were able to share platform progress with their internal teams to consider potential program participation. For example, representatives from PG&E attended to better understand the offering and consider it for future proposals or bids from PG&E. Similarly, labor organizations like the National Electrical Contractors Association and International Brotherhood of Electrical Workers, were able to see the benefits of the platform, including building awareness around safety training and qualification, and consider sharing that awareness with organization members.

Next Steps for Platform Components

Despite challenges experienced in this project, many elements of this platform have a bright future and a potential for scaling adoption of DER technologies in California. Future considerations for commercialization will draw on lessons learned from this pilot. A key lesson from attempted deployments was the need for clear, proven use cases and the deployment of those use cases. Platform deployments are most successful with clearly defined requirements and a strong understanding of users, and this pilot struggled in instances where those elements were not well understood.

Before using the TradePro Connect platform, Qmerit's bid management and contractor network component had historically been most successful with EV charger installation. Instead of attempting to apply a successful EV charging product into new technologies and market sectors without a proven user experience and contractor base, future efforts to commercialize this concept will focus on building on that EV success. Since the start of this pilot Qmerit's bidding platform and contractor network have continued to grow in the EV space, and they now count nearly every EV manufacturer as a partner. Similarly, ProQure's success came in negotiating collective purchasing agreements for service providers to purchase maintenance, repair, and operations products. ProQure has since rebranded as Raiven and is focusing its commercialization efforts on EV charging products, not on attempting to serve the unproven and significantly more complex use case of institutional purchasing.

In addition to refocusing on clear, proven business cases, key functionality of the platform is also being refined, a much simpler task when use cases are pared down. For example, the platform's bidding functionality was difficult to implement at scale when a contractor network was not already in place. To address this, in addition to the challenge of users not committing to using the system until after they receive bids and know the price of services, the platform team is exploring the use of pre-negotiated prices for installation services. These prices would be calculated based on user inputs and presented up front to customers for approval ahead of contractor selection, eliminating the need to find multiple service providers for bids. Focusing on limited technologies and customers should make this a more realistic and successful commercial product. Ultimately, TradePro Connect and its component elements will help customers acquire and install DER products. Attempted deployments to use it as simply a contractor management tool did not take advantage of much of the differentiating functionality in the platform, and future commercialization efforts could instead seek to more fully leverage that functionality.

Knowledge Gained

The knowledge gained from this project lessened barriers initially identified. The knowledge gained showed that successful use of the tool reduced the complexity of the procurement process for both customers and service providers. As described in Participant Feedback in Chapter 3, customers were able to use the tool to choose from a short list of qualified service providers. Unfortunately, in the work taken to develop the platform and lessen these barriers, new challenges arose, as described in the Challenges section.

Knowledge Sharing

No new technologies were built for this project; rather, the information gathered through the TradePro Connect project generated a better understanding of procurement needs and challenges in the market.

Many groups and individuals have already accessed the information gathered through this research process. Utility Program Administrators, like PG&E, and local government organizations, like the Local Government Sustainable Energy Coalition, viewed the public landing pages to better understand TradePro Connect and Manage Your Power, and utility customers and service providers of the SOMAH and SCE's Smart Thermostat program accessed landing pages via their web browser. This is the primary source of information transferred to the marketplace. Energy Solutions also performed outreach to service providers in the form of online and virtual demonstrations and presentations from November 2018 to March 2020 that ensure this information, and any opportunities make their way into the market. Energy Solutions shared the TradePro Connect product at the California Green Business Network Conference on October 17, 2019. Information sessions on TradePro Connect for SCE's Automated Demand Response program were held for several service provider organizations in December 2018 through March 2020.

In addition, information about the product was shared with potential utility and program administrator clients via client meetings, presentations, and demonstrations throughout the research and implementation phase. Potential utilities and clients include PG&E, the Department of General Services (DGS), the Local Government Sustainable Energy Coalition, and Marin Clean Energy. Energy Solutions also published this final report through the CEC.

CHAPTER 5:
Conclusions and Recommendations

Chapters 2, 3, and 4 provide details describing the TradePro Connect project implementation and its functioning as a marketplace for customers and service providers to procure DER and EMT products and services. The work accomplished provided valuable perspective on the issues affecting both program participation and procurement processes. The project team was able to identify specific factors and interactions that inform future efforts to drive more widespread penetration of DERs among California regions and institutions and help meet California's aggressive goals and timelines for GHG reductions.

Conclusions

Creation of TradePro Connect enabled the team to test and explore various hypotheses on how best to facilitate DER procurement in California. Having set targets that proved challenging to achieve, the team entertained and executed alternative approaches (like a thermostat promotion), that added data points to consider in the future.

Public organizations can benefit from the training, information, and procurement-related tools in many ways. First, identifying an individual to attend training and assume the role of procurement helps define roles and the ownership structure. Second, organizations can share best practices, guidelines, and available specification resources. Third, instituting tools like TradePro Connect can help streamline and organize practices and reduce the risk of role misalignment. When tools are used properly, they can save time and ensure guideline compliance. Utility programs that incentivize technologies and reduce barriers to DERs and EMT procurement can help drive participation by requiring the use of a purpose-built platform like TradePro Connect. A targeted list of appropriate technologies where the platform would provide value include:

- EV Charging Stations
- Solar Storage Installations
- HVAC
- Water Heaters
- Greenhouses

Recommendations for Future Projects

Top recommendations coming out of this project can help inform future efforts to address the procurement challenges facing DER and EMT projects through utility- or institution-sponsored programs.

Focus on Specific Use Cases. Define strategies for one technology component and conduct market actor testing to develop proven use cases before deploying at scale. Track key performance indicators for the project to indicate readiness for additional integrations or deployments.

Partner Engagement. Focus on one integration at a time to avoid unnecessary complexity. Identify key steps that will strengthen value propositions for the project as a whole.

Channel Strategies. Develop a strong value proposition that demonstrates the platform's usefulness to key utility players; cultivate cooperative relationships in the early stages of project development. Develop a strategy that provides savings forecasts before attempting commercialization.

Program Participation. Test the market by first initiating a single program; once established, bring additional programs to scale participation. Programs that rely on pay-for-performance incentives may introduce more risk than participants are willing to undertake and complicate the bidding process, so focus on those with fixed incentives and time-and-materials costs.

Recruitment and Growth Strategies. Aim to first enroll either service providers or customers for a foundation to build upon. Working with upstream market actors (for example manufacturers and large distributors) that have established contractor networks is an efficient way to promote the platform and get service providers on board.

Anticipate Bidding Processes. Allow adequate consideration of customer needs and building factors; provide for iteration on specifications.

Analyze Competing Procurement Platforms. Identify the functionality provided by existing platforms that participants find easy to use. TradePro Connect incorporated unique features and functionality, but service providers who participated in other procurement networks already were often reluctant to engage with a new one. Look for familiar features or capabilities that will make the program easy for new participants to use.

CHAPTER 6:
Benefits to Ratepayers

Implementing TradePro Connect under the right conditions can create ratepayer benefits that include lower costs for demand-side management projects, new projects in underserved markets, increased safety, and greater reliability. The project attempted to achieve these benefits through:

- Competition among service providers to provide fair pricing for customers.

- Participation in a GPO to enable economies of scale and offer a more level playing ground for smaller service providers.

- Procurement process improvements that leverage a streamlined technology solution allowing small commercial and institutional customers to pursue energy- and cost-saving projects at sites previously considered to not be cost-effective.

- Automated tracking of service provider credentials and performance management.

- Higher quality installation and commissioning services for networked systems with automated fault detection.

Economic, Environmental, and Societal Benefits

Reduced Project, Capital, and Operations and Maintenance Costs

Building trade service providers and engineers purchase $29.6 billion in parts and equipment each year for service, maintenance, and retrofits. Apart from a few large firms, service providers, and engineers do not receive volume pricing from suppliers. Moreover, large companies often subcontract to smaller companies; since the smaller companies purchase materials, they cannot leverage the buying power of larger companies and project costs end up higher than they need to be. TradePro Connect has the potential to lower project costs through reduced energy costs, lower DER system implementation costs (capital costs), and lower operations and maintenance costs due to:

1. Participation in the GPO, resulting in lower mark-ups from service providers to customers.

2. Greater energy savings and lower operations and maintenance costs throughout the measured lifetime due to improved system commissioning.

3. Faster recognition of savings and revenue benefits from streamlined procurement, enabling projects that would otherwise not be cost-effective.

Increased Safety

Quality and safety are integrated into every step of the TradePro Connect procurement process, resulting in significant benefits. TradePro Connect requires that all service providers

have the necessary licenses, insurance, certifications, and training for the work they are completing, and further requires the highest levels of training and certification. Over time, the best service providers will receive more work using the Qmerit Contribution Index (QCI™) performance measurement system, which is a continuously calculated score based on past performance, callback rates, procedural compliance, and other factors.

Energy and Environmental Benefits

TradePro Connect can not only save energy through the implementation of demand side management measures, it can also match service providers based on experience, cost, geography, and availability. This helps to reduce vehicle miles traveled, which in turn reduces energy consumption.

Reliability

Proper design, commissioning, operations, and maintenance are all critical to the persistence and reliability of DER technologies. All service providers performing work through the platform will have the necessary licenses, insurance, certifications, and training for the work they are completing for, and be incentivized to perform quality work at a fair price through the QCI™ rating system. Furthermore, by focusing on replacing static widgets with networked systems, building loads will be more capable of reacting to grid conditions and providing automated fault detection to enable timely repair services.

Economic Development

By streamlining the procurement process for advanced DER technologies and improving the quality assurance process, TradePro Connect could generate greater demand for these technologies (both from consumers and service providers), incentivizing further investments in DER research, development, and workforce training.

Customer Appeal

TradePro Connect could vastly decrease the risk, time investment, and inflated costs that characterize procurement processes for many customers. Customers have greater transparency into their providers' past results and feel more confident knowing the contractor has been thoroughly vetted by industry experts.

For customers like local governments that might be interested in implementing a timesaving streamlined technology solution, challenges remain. It became apparent through market research that changing longstanding processes and providing staff training on new software or technologies presented barriers that diminished the solution's appeal.

Potential Electric Energy and Natural Gas Costs

TradePro Connect can claim all the energy savings and 1.8 percent savings on project capital costs for the demonstrations implemented through the CEC-funded project. Total benefits from the 50 demonstration projects implemented through this California Energy Commission-

funded effort equated to nearly $2 million of electric cost savings and 420 metric tons of carbon dioxide equivalent over the life of the projects.

Future Studies or Projects

The technology is intended for customers and service providers and cannot be adapted to a business or resident. Potential additional research or follow-up projects are described above in Additional Research Needed, in Chapter 3, and include:

- Optimization of model matching computations to increase speed of response.

- Software modifications needed to enhance scalability with a diverse group of product categories.

- Cost analysis of additional software functionality tradeoffs.

- Advantages to users of additional features such as dashboards or filtering.

GLOSSARY AND LIST OF ACRONYMS

Term	Definition
Auto-DR	automated demand response
CCA	community choice aggregator
CPUC	California Public Utilities Commission
CSLB	Contractors State License Board
DR	demand response
DER	distributed energy resource
EV	electric vehicle
EMT	energy management technology
GHG	greenhouse gas
GPO	group purchasing organization
LGBT	lesbian, gay, bisexual, transgender
MCE	Marin Clean Energy
PG&E	Pacific Gas and Electric Company
QCI™	Qmerit Contribution Index
SCE	Southern California Edison
SOMAH	Solar on Multifamily Affordable Housing
TAC	Technical Advisory Committee
ZNE	zero net energy

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Appendix A: Estimated Savings

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APPENDIX A: Estimated Savings

Table A-1: Estimated First Year Electric Energy Savings from Impacted Market Segments for Different Adoption Scenarios in 2024

Market Segment	kWh/sqft	Million sqft in 2024	GWh Savings			First Year Electric Cost Savings (Millions of $)			First Year CO2e Savings (Millions of metric tons)		
			Low Adoption	Med. Adoption	High Adoption	Low Adoption	Medium Adoption	High Adoption	Low Adoption	Medium Adoption	High Adoption
Post High School Education	3.46	622	54	107	161	8	17	25	39	78	118
Grocery	16.77	648	271	543	814	42	85	127	198	396	594
Hotels, Hospitality Sector	4.46	681	76	152	228	12	24	36	55	111	166
Large Offices (>30,000 sqft)	7.25	2,613	474	947	1,421	74	148	222	346	691	1,037
Small Offices (<30,000 sqft)	4.67	764	89	178	268	14	28	42	65	130	196
Misc.	3.83	3,002	288	575	863	45	90	135	210	420	630
Refrigerated Warehouses	8.15	125	26	51	77	4	8	12	19	37	56
Restaurants	14.38	397	143	285	428	22	45	67	104	208	312
Retail (Not Grocery)	3.67	2,451	225	450	675	35	70	106	164	329	493
Primary and Secondary School	2.35	1,142	67	134	201	10	21	31	49	98	147
Unrefrigerated Warehouses	2.58	2,203	142	284	427	22	44	67	104	207	312
Total:			**1,854**	**3,708**	**5,563**	**290**	**580**	**870**	**1,354**	**2,705**	**4,061**

Source:

**CALIFORNIA
ENERGY COMMISSION**

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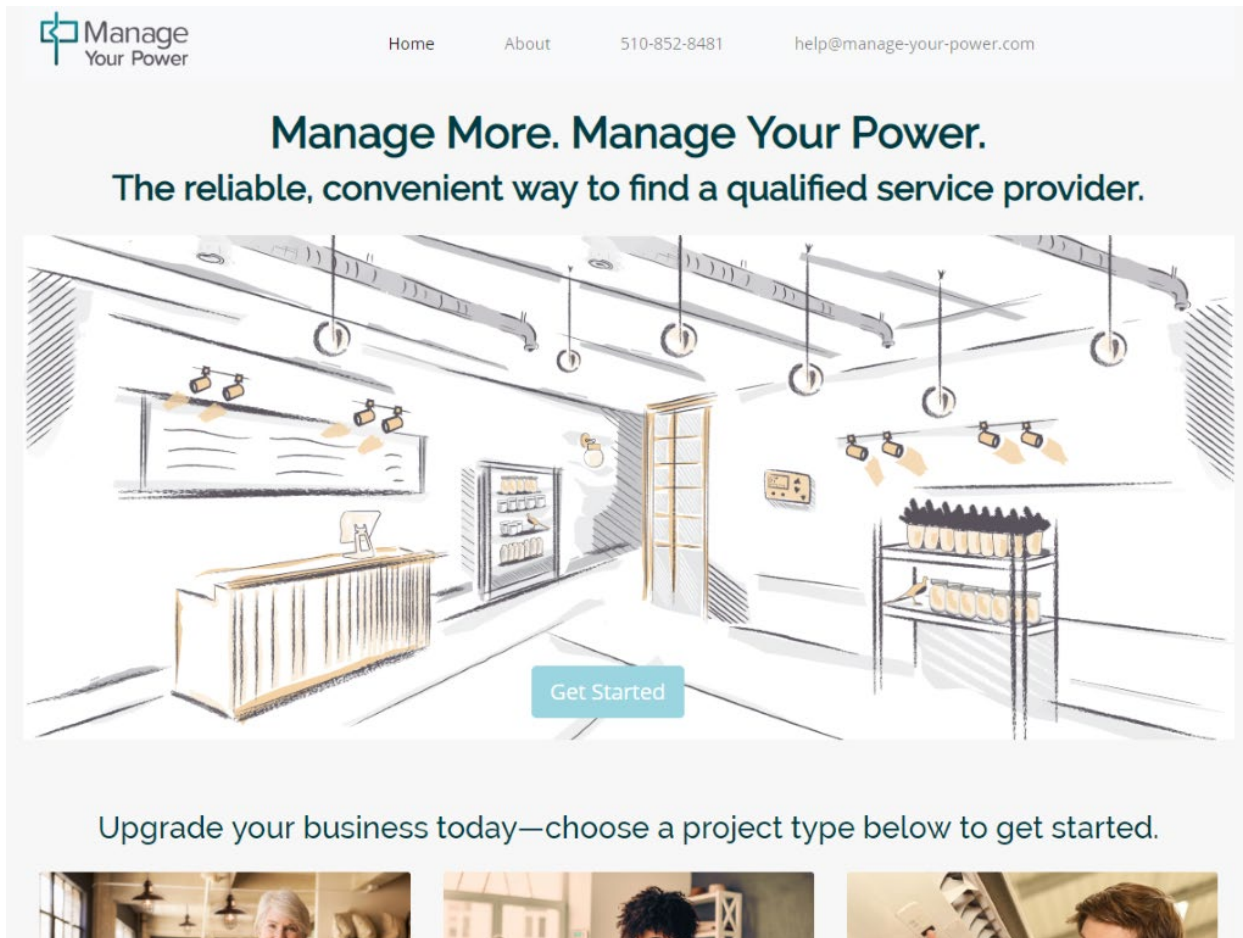
Appendix B: Platform Screenshots

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APPENDIX B:
Platform Screenshots

Figure B-1: Manage Your Power

Figure B-2: TradePro Connect

Figure B-3: Service Provider Profile