

CITY OF SAN DIEGO

PURCHASING & CONTRACTING DEPT. 1200 Third Avenue, Suite 200 San Diego, CA 92101-4195

REQUEST FOR INFORMATION (RFI) COVER SHEET PROGRAM(S) TO MEET CITY'S 100% RENEWABLE ENERGY GOALS ADDENDUM B

Subject: Solutions to Support the City of San Diego's Goal of 100% Renewable Energy

Date Issued: September 23, 2016

Response Date and Time (Closing Date): October 28, 2016 at 3:00 p.m.

Questions/Comments Due Date:

City Contact Name and Information: Maureen Medvedyev, Principal

Procurement Specialist, Mmedvedyev@sandiego.gov

October 5, 2016 at 5:00 p.m.

Respondent's Information:

Respondent Name: Center for Sustainable Energy

Address: 9325 Sky Park Court, Suite 100, San Diego Ca 92123

Telephone No. and E-Mail Address:(858) 244-1177 Len.Hering@energycenter.org

Website: www.energycenter.org

Authorized Re	presentative Name and	Len Hering, RADM, USN (ret) d Title: Executive Director	
Representative	's Original Signature	Aldaij	
Date Signed:	10/26/16		

TO BE CONSIDERED, RESPONDENT MUST:

- 1) Provide all requested information identified in this Cover Sheet.
- 2) Submit all requested information described in the RFI.
- 3) Submit all requested information on or before the Closing Date.

Goods and Services RFI Revised: October 13, 2014 OCA Document No. 855607

Solutions to Support the City of San Diego's Goal of 100% Renewable Energy

October 28, 2016

Submitted to City of San Diego

Submitted by Center for Sustainable Energy



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Office Locations San Diego Los Angeles Oakland Boston October 28, 2016

City of San Diego Purchasing and Contracting Department 1200 Third Ave, Suite 200 San Diego, CA 92101

Attn: Maureen Medvedyev, Principal Procurement Specialist

Subject: Solutions to Support the City of San Diego's Goal of 100% Renewable Energy

Dear Ms. Medvedyev,

The Center for Sustainable Energy (CSE) is pleased to submit our response to the Request for Information for Programs to Meet the City of San Diego's (City) 100% Renewable Energy Goals.

A 501(c)(3) nonprofit organization, CSE is an established leader in assisting public agencies to implement programs in support of sustainability and greenhouse gas (GHG) reduction goals. We understand the constraints and opportunities facing the City of San Diego in achieving 100% renewable energy by 2035 and have the broad expertise and resources necessary to help the City meet this goal.

CSE is excited at the prospect of working with the City to help achieve Climate Action Plan goals, including reaching 100% renewable energy by 2035. We believe that our proposed project to conduct a comprehensive research and evaluation study to identify how best to increase localized deployment of distributed energy resources in the commercial and industrial sector will make a significant contribution to this goal.

Questions of a technical nature should be addressed to Ria Langheim, Senior Research Analyst, at 858-633-1391 or via email at ria.langheim@energycenter.org.

Sincerely Hering, RADM, USN

Executive Director



RFI Questions and CSE's Answers:

1. Please provide a detailed description of the concept (project or program) you are submitting for consideration. Where not otherwise addressed below, please include discussions such as feasibility, impact/benefits, timeframe, costs, and examples of similar successes.

CSE proposes that the City of San Diego conduct a comprehensive research and evaluation study to identify how best to increase localized deployment of distributed energy resources (DER) in the commercial and industrial (C&I) sector. The study would identify the existing value streams and look to quantify other benefits of localized DER deployments such as increased reliability and strengthening resiliency to these customer segments and to the City. This project will support efforts to achieve 100% renewable energy in the City of San Diego by 2035 by increasing adoption of these technologies in the high-potential C&I sector.

While the adoption of certain DER technologies has increased in the C&I sector of the City of San Diego, it lags behind DER technology adoption in the residential sector in terms of installed capacity as well as number of installations.¹ Relative to residential customers in the San Diego Gas and Electric territory, commercial customers alone have greater annual energy usage and so offer a greater potential to utilize advanced renewables, storage and load management technologies.²

There are a number of benefits which commercial and industrial operations can realize from the deployment of DER. The most often cited include energy and demand cost savings and pollution and GHG abatement. In addition to these benefits, through individual or combinations of technologies such as solar, energy storage and combined heat and power, the C&I sector has the potential to realize reliability and resilience benefits which can be an added value not only to their own operations but also



¹ As of July 2016, 27,216 residential solar PV systems have been interconnected in the City of San Diego compared to 733 solar PV systems in other sectors. The residential solar capacity comprises 126 MW compared to 50MW in other sectors (NEM Currently Interconnected Data Set. <u>www.californiadgstats.ca.gov/downloads</u>. Last updated: August 2016). Under the Self Generation Incentive Program 88 CHP and Energy Storage systems have been installed in the non-residential sector in the City, equaling 35MW (Self-Generation Incentive Program Statistics. www. energycenter.org/self-generation-incentive-program/program-statistics. Accessed on October 16, 2016.) ² Kavalec, Chris et al., 2013. *California Energy Demand 2014 -2024 Preliminary Forecast, Volume 2: Electricity Use by Utility Planning Area. California Energy Commission, Electricity Supply Analysis Division*. Publication Number: CEC-200-2010--004-SD-V2.

to the local grid and adjacent communities. We define energy reliability as the ability to maintain operations during low consequence, high probability events. These might be outages that happen several times a year and can be seconds, minutes, hours, or days long. We define resilience as the ability of an energy system to endure and maintain or retain sufficient operational activity during and after a major disruptive event such as a natural disaster, a cyber-attack or a disruption in fuel supply.³

There are two reasons the City of San Diego should look to improve local grid reliability and overall resiliency to natural hazards. First, there have been major power outages in the SDG&E territory in the past (e.g. 2011) and according to the SDG&E power outage maps, smaller outages occur quite regularly, often affecting several hundred customers. Businesses can incur substantial losses during power outages or periods of variant power quality.

Second, in the past month, the United States Geological Survey has posted warnings about increasing earthquake risks in the region. Events of this scale and nature can potentially lead to several days of outages potentially affecting a large number of city customers.

Benefits such as reliability and resiliency are often not fully taken into consideration when investment/adoption decisions are being made by business owners, so a fuller understanding of these added value streams can help promote greater DER technology adoption yielding benefits to both businesses and the City. Moreover, a more comprehensive knowledge of value streams can inform local climate adaptation and energy security measure planning by the City of San Diego.

Based on similar projects comprised of evaluation, research, stakeholder engagement and initial outreach components conducted by the Center for Sustainable Energy and others, we estimate that the project can be conducted in a timeframe of 2-3 years at an approximate cost of \$1,100,000.

There are a number of efforts underway that can provide insights into the potential of such a project and enable the City to build upon previous successes. Under the Department of Energy funded Solar Market Pathways program, CSE is currently evaluating the application of solar in the multi-tenant sector utilizing virtual net metering tariffs. The project has yielded valuable insights into market successes and barriers in California. Under the same program, the City of San Francisco is conducting a study to create

³ Chittum A. (2016) "Valuing Resiliency: How Should We Measure Risk Reduction". *In Proceedings of the ACEEE 2016 Summer Study on Energy Efficiency in Buildings*, 11-1 -11-15. Asilomar, CA: ACEEE.



a roadmap for deploying solar with storage for resilience both locally and nationally.⁴ Additionally, the proposed project can build on methods developed by The New York Prize program which developed a cost-benefit framework that includes full evaluation of resilience and reliability benefits of proposed microgrid projects in NYSERDA's energy territory.⁵ Findings from these and other past projects can inform the design and implementation of this project for the City.

2. The City is interested in how recommendations will fit into CAP efforts. For each proposed project or program, identify which goals of the CAP and objectives referenced in section I.C will be achieved, and how they will be achieved.

City Objective 1: In addition to achieving the 2035 target, the strategies desired by the City and in the spirit of the CAP include, but are not limited to:		How the proposed DER in C&I Sector Research and Analysis Study addresses this Objective
1.1	Contributing to the City's 100 percent renewable electricity goal by 2035	The proposed project focuses on the deployment of DER in the commercial and industrial sector which has significant potential for additional renewable generation capacity.
1.2	An energy portfolio with lower carbon content than is currently provided, and lower than that required per California SB 350 and the State's Renewable Portfolio Standard	The proposed project will focus on increasing the adoption of customer-sited renewable energy in the City of San Diego. Distributed renewable generation provides a zero carbon energy supply and will therefore contribute to a lower overall emission factor.
1.3	Identifying new and diverse sources of renewable energy to supply electricity and/or reduce greenhouse gas emissions	The proposed project will investigate value streams of a diverse set of distributed energy technologies. In particular, it will focus on value streams of nascent technology deployments, such as combinations of energy storage and PV systems.
1.4	Ensuring reliable and sustainable energy services for both the near- and long-term	The proposed project seeks to uncover existing reliability and resilience benefits of DER to the City. The study can be utilized to spur greater adoption of DER systems that can provide these benefits to facilities, the local grid and adjacent communities

⁴ For more information about these Solar Market Pathways projects visit www. energy.gov/eere/sunshot/solarmarket-pathways.

⁵ https://www.nyserda.ny.gov/All-Programs/Programs/NY-Prize/Resources-for-applicants.



1.5	Spurring new renewable energy development	The proposed project focuses on furthering the deployment of DER in the C&I sector which has significant potential for additional renewable generation capacity and related economic activity.
1.6	Following the State of California's loading order by considering energy efficiency, demand response, and other alternatives to generation for buildings in the City above levels currently achieved	The project seeks to research value streams of DER adoption which includes value derived from demand response and load management technologies. In addition, we propose to include cogeneration systems (i.e. CHP). These types of systems provide efficiency benefits by combining electricity generation with thermal loads in buildings and factories, capturing much of the energy that would otherwise be wasted.
1.7	Considering social equity in efforts to reduce greenhouse gas emissions;	Medium and large commercial and industrial operations are often located in areas with higher pollution/emissions. By focusing on the adoption of distributed energy systems in the commercial and industrial sector, the City can increase efforts in areas where the population is disproportionally affected by pollution/emissions. The benefits will extend to so-called 'non-energy benefits'. For example, during times of major outages, communities could seek shelter in areas/facilities with uninterrupted energy supply.
1.8	Increasing resources dedicated to local investment and economic development;	The City can utilize insights from the study to target deployments of distributed generation in areas in most need of grid support and business and community support in the event of vulnerabilities.
1.9	Creating green jobs in San Diego above levels currently achieved.	By focusing on localized customer sited renewable generation instead of procuring energy from distant utility-sited projects, the City of San Diego can increase jobs related to DER planning, inspection, installation, etc. within the City limits.
City Ob	jective 2: The City is interested in ideas that:	How the proposed DER in C&I Sector Research and Analysis Study addresses this Objective
2.1	Are cost effective for the City and its communities, businesses and residents	The proposed project will help the City to pinpoint cost-effective solutions of deploying customer or community solar type projects if customer-sited solar deployment proves not to be cost-effective. In addition, the project will provide insights into how localized grid areas can benefit from customer-sited DER, which can help divert resources from expensive infrastructure upgrades.
2.2	Consider the effects on the City's communities, businesses and residents	The proposed project focuses on value streams of DER for commercial and industrial businesses and will particularly focus on how some of the benefits extend to the adjacent communities. The project will



	engage with a substantial number of businesses with the goal to provide facility owners and other stakeholders in the commercial and industry sectors with comprehensive information of how DER can work for them.
Are innovative concepts and/or technologies;	This project is looking at value streams of DER beyond the conventional economic and GHG cost/benefit areas. It will include benefits such as reliability and resilience that are often not considered. Additionally, the project will investigate whether benefits extent to adjacent communities and the local grid. Thus the project will take a system rather than a "closed entity" look at deployment of DER. In addition, innovative combinations of technologies may prove beneficial.
Ensure long-term greenhouse gas reductions;	The proposed project will focus on increasing the adoption of customer-sited renewable energy in the City of San Diego. Distributed renewable generation provides a zero carbon energy supply and will therefore contribute to a persistent lower overall emission factor. The installed systems will provide renewable generation for several decades without replacement.
Minimize the use of renewable energy certificates (RECs)	The proposed project focuses on furthering the deployment of DER in the C&I sector which has significant potential for additional DER capacity. By increasing the share of distributed renewable generation, the City will have to purchase less renewable energy certificates to offset emissions (as per CAP appendix Table 12).
	Are innovative concepts and/or technologies; Ensure long-term greenhouse gas reductions; Minimize the use of renewable energy certificates (RECs)

3. Does the project or program support the City's renewable energy goals? How?

The proposed project focuses on supporting the deployment of behind-the meter DER in the C&I sector, which has a high potential for additional renewable generation capacity. A research and evaluation study will identify how best to increase localized deployment of DER in these sectors. The project will help promote deployment of DER among existing and new commercial entities in the City. In addition, it would influence future DER program planning and design and general City planning.

4. What are specific technologies and estimated costs required to implement recommendations, and what might be appropriate funding mechanisms? Identify parties that may incur the costs (e.g., City, residents, businesses, ...etc.).

Based on similar projects conducted at CSE and elsewhere, we estimate that the proposed research and evaluation project can be conducted in a timeframe of 2-3 years at an approximate cost of \$1,100,000.

The City of San Diego could seek federal or state funding (e.g. Department of Energy SunShot or CEC EPIC grants) to support the project.

To implement recommendations coming forth from the research and evaluation project, the City can design and implement strategies or programs that increase penetration of renewables in the C&I sectors, while meeting reliability and resilience goals. This phase could be supported by CAP funding. In addition to funding supporting the City's CAP implementation, a C&I DER deployment program could be funded through state funding to support deeper market penetration of solar and storage technologies and coadoption. Moreover, the City could take advantage of federal grants in this area, particularly for mid-sized commercial customers - a key market segment for the Department of Energy.

5. What is an estimated timeframe for implementation of projects or programs submitted, and what are the factors that may contribute to accelerating or slowing the implementation timeline?

We estimate that the project can be implemented in a timeframe of 2-3 years. This timeframe could be accelerated with additional funding to increase staff levels.

In order to maximize the effectiveness of the project and minimize the overall timeframe, the project should explore lessons learned from previous projects. As described in Question 1, there are several projects underway in California and other states that this research and evaluation study can build upon.

Other potential factors that would impact the timeline are obtaining a sufficient sample of existing DER facility and business owners in the City to pinpoint value streams across facility types. Under the SGIP program, a substantial number of advanced energy storage projects are currently reserved in the City of San Diego. If these systems come online before the start of the study, the study can potentially draw from more examples of solar and energy storage adoption.

In addition, exploring reliability and resilience benefits for localized grid networks requires information about the local grid infrastructure. Obtaining accurate information will be critical to the success of a timely delivery of the project.

6. Who are potential participants in the implementation and operation of the proposed projects or programs?

The proposed project will engage with a variety of stakeholders. Throughout the project timeframe, the City of San Diego, commercial and industrial customers, and the utility/electricity provider in the City will play a pivotal role in direction and completion of the project.

Throughout the project, stakeholders that operate within the commercial and industrial sectors such as property owners, portfolio managers, investors, insurance agencies and solar installers will be consulted and engaged to understand potentials and barriers to DER deployment in these sectors.

Additionally, the project team should engage with cities that have embarked on or already created roadmaps for energy resilient communities.



7. How is the specific project or program new or different than what the City is currently doing, and how can it potentially be integrated with existing or future projects or programs?

The City of San Diego does not currently have a program that specifically targets DER in the C&I sector. Furthermore, there are currently no efforts/programs underway that value or target reliability and resiliency of these technologies for emergency or disaster planning purposes, and the proposed research aligns with the City's CAP Adaptation goals. This research would also tie in with the City's existing solar planning and deployment for public buildings.

8. What are potential obstacles to implementation, including compliance requirements, regulatory barriers, technological or market feasibility, financing limitations and/or other parameters? Identify potential solutions for each.

The project requires a sufficient sample of existing DER facility and business owners in the City of San Diego to pinpoint value streams across facility types. We expect that pending SGIP applications will provide these sites. Alternatively, examples from projects located outside of the City but within the SDG&E territory could be utilized for analysis of value streams.

Exploring reliability and resilience benefits for localized grid networks requires information about the local grid infrastructure. Obtaining accurate information will be critical to the success of a timely delivery of the project. The project team can engage with the energy provider early on in the project to facilitate communication of data needs and possibilities.

Tariffs and policies can change during the project timeframe, which may impact value propositions of DER in the C&I sector. Over past years, the DER markets have seen many changes. In the solar market the emergence of new business models present new options for DER customers. It is therefore important for the project team to continuously engage with market actors and policy makers to stay abreast of changes and solutions offered.

9. What are the estimated results of the proposed concept(s), including the potential for greenhouse gas emissions reductions, numbers of residents and/or businesses accessing the program, economic impacts, ...etc.?

The proposed project will focus on identifying how to best increase customer-sited renewable energy in the high potential C&I sector in the City of San Diego. Based on SDG&E's annual electric C&I load profile data we estimate that there is a potential to deploy up to 2.1 GW of additional zero carbon generation (providing approximately 30% of the current consumption in the commercial and industrial sectors of SDG&E) and 226 MW of advanced energy storage or load management technologies in the entire utility territory. The City's potential will be proportional to SDG&E's consumption, which according to the CAP appendix is approximately 44% of SDG&E's consumption.

Distributed renewable generation provides a zero carbon energy supply and will therefore contribute to a lower overall emission factor.



By focusing on localized customer sited renewable generation instead of procuring energy from distant utility-sited projects, the City of San Diego can increase jobs related to solar planning, inspection, installation etc. located within the City.

The project will engage with a substantial number of businesses (estimated 50-100) to gauge value propositions of DER. The goal of the project is to provide facility owners and other stakeholders in the C&I sectors with comprehensive information of how DER can work for them. To maximize project results, outreach and engagement efforts could be initiated, targeting the entire business segment in the City of San Diego. Additionally, the study will help the City design strategies or programs that target DER adoption in the C&I sector.

10. Include any other comments that you would like to offer that were not previously addressed.

Thank you for the opportunity to provide comments. Do not hesitate to follow up if you have any questions. We look forward to your feedback.

