



City of Palo Alto
Utilities Advisory Commission Staff Report

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Summary Title: Program for Emerging Technologies Update

Title: Discussion and Update on City of Palo Alto Utilities Program for Emerging Technologies

From: City Manager

Lead Department: Utilities

EXECUTIVE SUMMARY

The Program for Emerging Technologies (PET), (www.cityofpaloalto.org/UTLIInnovation) provides the opportunity for early-stage businesses and researchers to submit proposals for innovative pilot projects to City of Palo Alto Utilities (CPAU). The goal is to find and nurture creative products and services that will improve customer value, save natural resources, and/or reduce carbon emissions.

The report includes updated evaluation criteria to help focus applications on CPAU's core target areas and better align with the customer program priorities. Staff is also changing the pilot project application cycle to once annually, rather than being accepted on a rolling basis and evaluated quarterly. In addition to these updates, this report also includes a summary of the value of PET to the City, highlights from featured past projects, and a summary of applications from FY 2020 and the program overall.

BACKGROUND

The City's Innovation and Emerging Technology Demonstration Program (now PET) was approved in January 2012 and launched in June 2012. The program focuses on promoting the testing, evaluation and deployment of new technologies related to the provision of utility service. Since the launch of the program it has received 94 applications, with 25 completed projects (completed projects include both letters of support and completed pilot projects). In FY 2020, eight proposals were received. Of these proposals five projects were accepted and are either active or completed, two were declined, and one is still under consideration.

In addition to the projects received through this program, the City is also proactively fostering innovation through many different avenues, including research collaborations, regional collaborations, and participating in events which highlight important issues going forward. CPAU sponsored and judged the GridShift Hackathon with PowerHouse Ventures and Silicon

Valley Clean Energy (SVCE) this January. Several promising early-stage companies reached out after the event, and staff is in the process of assessing them for the best fit, while also encouraging them to register for the City's procurement platform to ensure that they receive future requests for proposals (RFPs). Staff also participated in evaluation panel for SVCE's Spring 2020 Innovation Onramp, and is exploring several potential collaborations.

DISCUSSION

The program continues to be focused on fostering innovative and potentially transformative technologies in core target areas. This section is comprised of I) value of PET to the City, II) program changes and updates, III) highlights from featured projects, IV) summary of applications for FY 2020 and since program launch in 2012.

I. VALUE OF PROGRAM FOR EMERGING TECHNOLOGIES TO THE CITY OF PALO ALTO

PET brings four areas of key value to the City:

- 1) A mechanism to collect more and better market information on areas of emerging strategic importance;
- 2) An increase to the number, quality, and innovative respondents to City RFPs;
- 3) Ongoing education for staff for emerging market trends and cross-training; and
- 4) Improving and accelerating development in areas of strategic importance to the City and CPAU.

1. Improving quality and timeliness of information on emerging market trends

This program saves customers money by keeping staff abreast of emerging technologies and market trends. Increased knowledge and understanding narrows uncertainties as markets evolve, and a clear understanding of market trends and key project and contract terms saves time and money.

This concept is sometimes called the business of value of information and is one of the core values that PET brings to Palo Alto. More information means lower uncertainty, lower risk, and ultimately lower costs. The Value of Information (VoI) is fairly simple: how much additional information allows a decision-maker to improve their decision, and the associated value saved or earned. The better the information, the better the knowledge and ultimate decision making. Both by evaluating applications, engaging in academic collaborations, engaging in pilot projects, and sharing the results of pilot projects PET increases information and knowledge throughout City of Palo Alto Utilities, leading to better business decisions with lower costs and higher value to customers.



Figure 1. (a) Value of information in decision making. Source: <http://www.provisdom.com/blog/value-of-information>. (b) This figure helps show how additional data and information from timely and credible sources. Image Source: DIKW pyramid: data, information, knowledge, and wisdom / Source: Wikipedia

2. Increasing number, breadth, and quality of applicant pool for City of Palo Alto RFPs

PET has routed several companies and technologies to register for the City’s procurement system, ensuring that they are notified when RFPs are issued by the City. By increasing the visibility of the open City solicitations, this program broadens the applicant pool and encourages higher quality and more innovative responses.

3. Staff training and cross-training

PET is an effective way of routing emerging trends in technologies to relevant staff, thereby keeping staff abreast of emerging market and technology trends, improving program and project focus of RFPs, selecting vendors, and contracting with chosen parties.

PET is also an important mechanism for cross-training staff in emerging areas which are of professional interest to high-performing staff looking for growth opportunities.

4. Improving and accelerating utility and sustainability company development

Staff is helping to shape company development so early-stage companies are better informed of utility pain points and needs, as well as better address priorities for the City of Palo Alto Utilities. The goal is to find and nurture creative products and services that have strategic value to by improving customer value, saving natural resources, or reducing carbon emissions. By helping to better inform early-stage companies about utility pain points, business processes, and needs in these areas through PET, CPAU can strengthen the innovation ecosystem of companies focused on energy, water, carbon, safety, resiliency, and other utility needs. The PET pilot project with AutoGrid is a good example of how CPAU helped foster innovation throughout the flexible demand response space.

II. PROGRAM CHANGES AND UPDATES

The three updates and changes that staff is making to PET are 1) updating the program goals and evaluation criteria, 2) changing to an annual application cycle for pilot project proposal evaluation, 3) clarifying the goals and process for the academic collaboration process. The

program continues to be focused on fostering innovative and potentially transformative technologies in core target areas.

1. Updated Goals & Evaluation Criteria

Staff is revamping the program’s guidelines and evaluation criteria to highlight what makes a compelling project pitch for CPAU, to provide more clarity for applicants and better focus the applications on the City’s areas of greatest interest. The updated evaluation criteria shown in item (b.) align with the updated priorities for the utilities customer programs and mirror criteria from SVCE’s Innovation Onramp. Projects that focus on data and information sharing are key priority areas for CPAU, given the safety considerations and staff time constraints for physical pilot projects. After updating the priorities on the PET website, staff will work with local universities and accelerators to solicit high-quality applications closely aligned with CPAU’s highest priorities.

What makes a successful application and pilot?

a. Is it innovative and potentially transformative?

- Is it new and innovative?
- If it succeeds, will it matter?

b. Does it significantly advance the utility’s priorities?

- Added Customer & Community Value
- Emissions Reduction & Environmental Benefits
- Scalable & Transferable
- Equitable
- Core Role for City of Palo Alto Utilities

c. Is the project the right fit for City of Palo Alto Utilities at the right time?

- Staff resource impacts
- Acceptance of the terms and conditions in the standardized partnership agreements
- Availability of co-funding for project, such as in-kind labor or external grant funding



2. Changing to Annual Cycle for Pilot Project Proposals

Staff will also be restructuring the program to review applications to accept proposals for pilot projects once a year. An annual solicitation cycle will: 1) allow all pilot projects applications to be evaluated at the same time ensuring the best overall fit, 2) allow staff to fit best projects into the annual work planning process, 3) align applications with external funding opportunities, 4) provide more clarity to applicants on timeline from application date. Applications for academic collaborations and letters of support will still be accepted on a rolling basis, with the expectation of evaluating applications within three weeks of application.

3. Academic Collaboration Structure

City of Palo Alto Utilities is a forward-thinking, public utility serving an innovative and environmentally minded customer base. These attributes make it uniquely suited to participate in strategic academic collaborations to ensure that research is grounded in real-world challenges and targeted on areas of high potential value. The City can also greatly benefit from the skills and modeling capabilities of academic researchers as staff has several anonymized data sets which could help inform the City's actions and improve overall understanding of emerging environmental and market trends.

III. FEATURED HIGHLIGHTS FROM FY 2020 AND PAST PROJECTS

FY 2020 Project Highlights

In January of 2020 the CPAU sponsored and judged the [GridShift Hackathon](#) focused on decarbonizing the energy sector with Powerhouse Ventures and Silicon Valley Clean Energy. Several of the participants work for early stage energy companies and have reached out about applying to the PET program. Staff has had several follow-up discussions with several relevant companies to determine whether the program is a good fit for their current needs, and if they are a good fit for CPAU's goals for this program. Staff also participated in the evaluation panel for SVCE's Spring 2020 Innovation Onramp and is exploring several collaborations.

A particularly interesting academic collaboration is currently underway with a Stanford graduate student. She is evaluating the impact of the switch to all-electric residences and the implications for the distribution systems, transmission system, electricity generation, and carbon emissions from electricity in California.

Highlights from some past projects

Enabling High Penetrations of Renewables on the Electric Distribution System

CPAU was a member of the Technical Advisory Group with SLAC National Accelerator Laboratory and Stanford University as a member of the Technical Advisory Group for PowerNET and VADER: Visualization and Analytics of Distributed Energy Resources. The proposed VADER program is to develop an open-source unified data analytics platform that will enable the integration of high penetrations of renewables on the electric distribution system. CPAU staff provided guidance to help maximize the value of the results of the 3-year research program to Palo Alto's service territory and other similar small municipal utilities.

Demand Response Program with AutoGrid

CPAU staff validated a customer-side demand management product from [AutoGrid](#) and its potential to benefit CPAU customers. CPAU helped AutoGrid develop the product offering, which forecasts customers' monthly peak demand, giving them a chance to shave energy consumption during a few peak hours each month. AutoGrid credits CPAU with helping them understand utility challenges and helping them launch, and now AutoGrid is a leader in the space, now controlling 5,000 MW of optimized flexible energy resources, citing "7 out of 10 Largest Utilities Control Assets with AutoGrid". CPAU ran its voluntary demand response program with AutoGrid for several years after completion of the PET project.

IV. SUMMARY OF TYPES OF PROJECTS IN FY 2020 AND STATISTICS SINCE PROGRAM LAUNCH

A high-level summary of the proposals received this year is shown below in Table 2. A summary of all the projects completed to date is shown in Table 3.

So far this year, none of the applications have reached the threshold of value, quality, and relevance to be a good fit for a pilot project. We are currently in discussions with some applicants about revising their projects and are also evaluating potential regional collaborations.

FY 2020 Completed Projects

In the first quarter of FY 2020 CPAU elected to close a one-year pilot with the start-up [UrbanLeap](#)-- a platform for streamlining intake, ranking, and tracking of innovative pilot projects within local governments. There is potential to use UrbanLeap or another platform for interdepartmental collaboration throughout the City, but the scale of the Program for Emerging Technologies does not warrant using dedicated software as a Utilities-only solution.

So far in FY2020 staff has also submitted three letters of support for exceptionally promising very early-stage technologies to research organizations and accelerators.

FY 2020 Academic Collaborations

CPAU is currently involved in two active academic collaborations. One collaboration is with a Stanford researcher modeling hourly all-electric load shapes for single family homes and the implications for the distribution systems, transmission system and electricity generation in California. The other collaboration is with a San Jose State researcher modeling the impacts of utility scale battery systems on the emissions of the California electricity wholesale market.

Table 1. Status and type of applications received in FY 2020.

| Application Date | Technology Area | Status | Progress to date | Desired Outcome | End Date |
|------------------|--------------------------------|--------------|------------------------------------|------------------------|----------|
| 1. 08/2019 | Energy Storage | Active | Committee for M.S. Thesis Proposal | Academic Collaboration | 08/2021 |
| 2. 01/2020 | Carbon-free electricity | Declined | Exploratory consultations | Pilot Project | - |
| 3. 01/2020 | Use data to lower emissions | Declined | Exploratory consultations | Pilot Project | - |
| 4. 04/2020 | Carbon-free electricity | Complete | Letter of Support | Pilot Project | 05/2020 |
| 5. 05/2020 | Transportation Decarbonization | Complete | Letter of Support | Letter of Support | 05/2020 |
| 6. 06/2020 | Building Decarbonization | Active | Initial research review | Academic Collaboration | 10/2020 |
| 7. 06/2020 | Emissions Mitigation | Complete | Letter of Support | Letter of Support | 06/2020 |
| 8. 06/2020 | Transportation Decarbonization | Under Review | Initial consultations completed | Pilot Project | TBD |
| | | | | | |

Table 2. Status to date of all applications to the Program for Emerging Technologies

| Deadline | Total Received | Under Review | Declined/Closed | Active | Completed |
|-----------------|-----------------------|---------------------|------------------------|---------------|------------------|
| FY 2013 | 13 | 0 | 11 | 0 | 2 |
| FY 2014 | 15 | 0 | 11 | 0 | 4 |
| FY 2015 | 15 | 0 | 11 | 0 | 3 |
| FY 2016 | 14 | 0 | 9 | 0 | 5 |
| FY 2017 | 10 | 0 | 7 | 0 | 3 |
| FY 2018 | 10 | 0 | 9 | 0 | 1 |
| FY 2019 | 9 | 0 | 5 | 0 | 4 |
| FY 2020 | 8 | 1 | 2 | 2 | 3 |
| TOTAL | 94 | 1 | 65 | 2 | 25 |

NEXT STEPS

Staff will update the program priorities and evaluation criteria in the online application and solicit applications for the annual proposal cycle by the end of 2020 or early in 2021.

RESOURCE IMPACT

Funding to cover staff time for one pilot project per year and ongoing academic collaborations continues as research, development and demonstration program expenses funded with electric public benefits funds. Depending on the pilot project the staff time is between \$25,000 and \$100,000. PET does not currently offer any direct funding to pilot projects, and the funds cover the staff time billed to the program. If very high-value projects were identified, Utilities could consider pursuing more than one pilot project a year additional dedicated staff time of approximately 0.3 FTE and funding of \$25,000 to \$100,000. Skilled staff time is the primary constraint, as additional funding could potentially be secured from electric public benefits funds or other sources such as research grants from the American Public Power Association, the Department of Energy, and others. Some of these sources of funds could also be used to cover the additional staff time, as well as provide funding to pilot projects.

ENVIRONMENTAL REVIEW

The Utilities Advisory Commission’s discussion of the Program for Emerging Technologies does not meet the definition of a project under Public Resources Code 21065 and therefore California Environmental Quality Act (CEQA) review is not required.