



CITY COUNCIL STAFF REPORT



October 24, 2023

ITEM TITLE

Agreement: Approve a Research Use Agreement with Icarus RT, Inc., and Approve the Installation of Solar Panels, Pool Heating Technology, and Electric Vehicle Chargers at Loma Verde Community Center

Report Number: 23-0238

Location: Loma Verde Community Center, 1420 Loma Lane

Department: Economic Development

Environmental Notice: The Project qualifies for a Categorical Exemption pursuant to the California Environmental Quality Act State Guidelines Section 15301 Class 1 (Existing Facilities) and Section 15303 Class 3 (New Construction or Conversion of Small Structures).

Recommended Action

Adopt a resolution approving the Research Use Agreement with Icarus RT, Inc., and the installation of solar panels, pool heating technology, and up to eight electric vehicle chargers at the Loma Verde Community Center at no cost to the City.

SUMMARY

Earth receives more solar energy hourly than the entire population consumes annually. As a result, solar power has become an integral source for the generation of electric power in California, contributing 26.6% of the state's electric power in Q1 2023, according to the Solar Energy Industries Association (SEIA). Most conventional systems are not effective at converting solar energy into electric power. At best, commercial solar photovoltaic (PV) systems convert about 20% of the sun's energy into electric power. PV panels fail to realize their full potential for a variety of reasons, including delayed return on investment, limited lifetime and inefficiencies in power generation, especially in terms of peak demand versus peak production hours. A major reason for PV panel inefficiencies and performance degradation over time is the thermal load on the panels from the sun. PV panel performance decreases as temperature increases, and thermal cycling caused by temperature fluctuations during operation stresses PV panels, reducing their product lifespan and lifetime performance. In California, the sun sets when peak demand begins, and this may lead to wasted resources.

Local company Icarus RT, Inc. applied for funding through the California Energy Commission to develop and pilot technology to address these issues. Through connections with Cleantech San Diego, Icarus RT, Inc. contacted the City of Chula Vista about the potential to be a demonstration site to test emerging technology.

After consultation with City staff, including careful consideration and site visits of several potential municipal locations, a planned demonstration site for a hybrid solar photovoltaic/thermal (PV/T) power boosting and water heating technology has been identified at Loma Verde Community Center. This site has been identified to receive a ground-mounted 280-kW solar array, pool water heating technology and up to eight (8) electric vehicle chargers, at no cost to the City. The Community Center should realize savings on utility bills due to generation of power through solar photovoltaic panels and the reduced need for pool water heating.

Through this action, staff is seeking Council's authorization to approve a Research Use Agreement with Icarus RT, Inc. and to approve installation of this technology at Loma Verde Community Center at no cost to the City. Installation is planned to take place from January 2024 to June 2025, with regular monitoring by Icarus, through June 2027.

ENVIRONMENTAL REVIEW

The Director of Development Services has reviewed the proposed project for compliance with the California Environmental Quality Act (CEQA) and has determined that the project qualifies for a Categorical Exemption pursuant to State CEQA Guidelines Section 15301 Class 1 (Existing Facilities) and Section 15303 Class 3 (New Construction or Conversion of Small Structures), because the proposed project would not result in a significant effect on the environment, create a cumulative impact, damage a scenic highway, or cause a substantial adverse change in the significance of a historical resource. Thus, no further environmental review is required.

BOARD/COMMISSION/COMMITTEE RECOMMENDATION

Not applicable.

DISCUSSION

The City of Chula Vista is located at the center of one of the richest cultural, economic and environmentally diverse zones in the United States. This natural environment helped City leaders recognize the value of preserving the environment for future generations and taking early action. Starting in 2000 with the adoption of the Carbon Dioxide Reduction Plan (or Climate Action Plan), which was the first Climate Action Plan (CAP) adopted in San Diego, the City's climate planning work over the past 23 years has made possible several community shared benefits such as utility savings, better air quality, reduced traffic congestion, increased public health, local economic development – improved quality of life. The City has made a commitment to technologies in support of those benefits, including installing over 120 electric vehicle chargers for fleet and employee use, starting to electrify its fleet, installing solar on many City facilities and deploying batteries at three of those locations. In its 2017 Climate Action Plan, the City set a goal of reaching 100% renewable electricity by 2035. The City is also a member of Cleantech San Diego, a member-based business organization that fosters collaborations across the private-public-academic landscape, supporting energy entrepreneurs through the Southern California Energy Innovation Network and encouraging more equitable investment across the San Diego region.

Icarus RT, Inc. is a San Diego-based engineering firm developing Quartet, a low-cost hybrid photovoltaic/thermal (PV/T) solar plus storage cogeneration system. The Icarus Quartet system cogenerates daytime solar thermal energy and provides hot water while cooling solar PV panels which

improves an array's performance by 12% or more. The system is designed to improve affordability, reliability and performance which enables increased integration, deployment and operation flexibility allowing solar power to better match demand. The system substantially reduces natural gas consumption and CO2 emissions. Icarus secured grant funding from the California Energy Commission to test the new technology and based on connections through Cleantech San Diego, contacted the City of Chula Vista to discuss the potential of hosting a demonstration site. Partnering with Icarus on this project supports the City's clean energy goals and helps pilot and showcase innovative and promising technology.

Per the Scope of Work for the California Energy Commission's solicitation Bridging Rapid Innovation Development to Green Energy (BRIDGE) EPC-21-016, this project will result in a ground-mounted 280 kW Solar Photovoltaic (PV) array. The Icarus technology converts the standard solar array into a hybrid PV/Thermal installation that will also co-generate hot water to be used for swimming pool heating. The resulting project will consist of a standard ground-mounted, south-facing PV array on the northeast side of the recently upgraded Loma Verde Community Center property.

In this case, cooling the PV panels using pool water should improve generation by 56,000-kWh annually. Since Quartet displaces natural gas required for heating, Icarus RT, Inc. estimates this system will provide the City with an annual savings of approximately \$195,000 as the array will heat water to 130 Fahrenheit. The solar array is estimated to produce 536 MWh electricity each year, which is equivalent to the amount needed to power approximately 50 homes annually. Considering power and thermal energy, this full hybrid PV/T commercial scale Quartet system is expected to generate 592 MWh/year between thermal and electrical power and prevent 1214 metric tons CO2e emissions annually, equivalent to the emissions of over 260 cars annually. The greenhouse gas emissions reductions resulting from this renewable energy technology will support goals from the City's 2017 Climate Action Plan and the City Operations Sustainability Plan. Icarus has signed a Master Services Agreement with Black and Veatch as the prime contractor for this project.

The goals of this project are to:

- Install, test and validate the performance and emission savings of a 280-kW Quartet System.
- Install up to eight EV charging stations.
- Cool PV panels to boost their power performance.
- Collect and store waste heat that can be harnessed to heat the new Olympic-sized pool.
- Generate hot water on-demand.
- Compare Quartet System performance to that of current solar plus storage systems.
- Utilize technology to reduce the City's increasing utility costs.

The planned demonstration site for this water heating technology is at the Loma Verde Community Center and will include a 280-kW solar array on the hillside behind the pool, connections to the pool heating system and eight (8) EV chargers in the parking lot, at no cost to the City. As the pool heating system will be powered by the new solar panels, the City should realize utility savings. In totality, this project will highlight the modern building and enhanced aquatic center at Loma Verde Community Center and will be a complement to the outdoor solar and battery powered lighting pilot project taking place at nearby SDG&E Park. Educational signage about this project is planned to be displayed on-site.

The City's Office of Sustainability will coordinate with Icarus RT, Inc. on this project, in conjunction with Public Works and the Community Services Departments. The technology will be installed, monitored, tested and maintained by Icarus through the end of the grant period at Icarus' sole cost. At the end of the project, maintenance of equipment will be the responsibility of the City.

Installation is planned to take place from January through June 2025, with regular monitoring of the system by Icarus until June 2027. Within 30 days of completion of the installation, the system and all components (including solar panels, pool heating technology and EV chargers) will become property of the City of Chula Vista. The City will support the installation of the PV/T System and any EV chargers by providing project analysis and inspection services and Icarus will not be responsible for the costs of City permits and inspections. The City will make all good faith efforts to otherwise support Icarus and enable completion and implementation of the Project.

Through this action, staff is seeking City Council's approval of a Research Use Agreement with Icarus RT, Inc. and to approve installation of solar panels, pool heating technology and up to eight electric vehicle chargers at the Loma Verde Community Center.

DECISION-MAKER CONFLICT

Staff has reviewed the property holdings of the City Council members and has found no property holdings within 1,000 feet of the boundaries of the property which is the subject of this action. Consequently, this item does not present a disqualifying real property-related financial conflict of interest under California Code of Regulations Title 2, section 18702.2(a)(7) or (8), for purposes of the Political Reform Act (Cal. Gov't Code §87100, et seq.). Staff is not independently aware, and has not been informed by any City Council member, of any other fact that may constitute a basis for a decision-maker conflict of interest in this matter.

CURRENT-YEAR FISCAL IMPACT

This technology is being installed at no cost to the City, except for the City's permitting costs which are anticipated to be offset with other budgetary savings within the non-departmental budget in the General Fund.

ONGOING FISCAL IMPACT

It is expected that the City will realize a decrease in energy costs at this community center, which will result in savings for the General Fund. This will be partially offset by any additional maintenance costs. Any resulting increase/decrease in costs will be considered as part of the annual budget development process.

ATTACHMENTS

1. Research Use Agreement with Icarus RT, Inc.
2. Icarus RT Chula Vista Site Assessment Memo

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