

Icarus RT, Inc.

Icarus doubles the energy output of commercial photovoltaic (PV) arrays while cutting the CO2 emissions and payback period in half.

ICARUS RT™



Company Overview

Icarus RT, Inc. is an award-winning advanced engineering company founded in 2016 and based in San Diego, CA developing Quartet, a low-cost hybrid photovoltaic/thermal (PV/T) solar plus storage cogeneration system. Quartet nearly doubles the energy output of new and existing, commercial, and industrial PV arrays while cutting the payback period and the CO2 emissions in half. A 100-kW commercial scale Quartet system generates 334,000 kWh/year and prevents 220 MT CO2e emissions.

Icarus' core mission is to safely empower our team, our customers, and our community to provide more reliable, less expensive, and cleaner global energy. To that end, we are steadfast in our commitment to produce quality, game-changing products and services through innovation and focus.

Problem

Photovoltaic (PV) arrays remain unattractive to business owners as an investment for several reasons, including delayed return on investment (ROI), limited lifetime, and most of all inefficiencies in power production. Today's panels only produce about 20% of the sun's energy into electric power, and performance drops as panels heat up daily. Of course, the sun sets daily and production drops to zero, often during peak demand. Also, thermal cycling stresses the PV panels, reducing performance during their lifetime, and reducing their lifespan. These problems, particularly the long ROI, continue to postpone widespread adoption of solar PV systems in commercial settings.

Icarus' Quartet system addresses these problems by cooling PV panel temperatures during operation, boosting panel electrical power output by 12-18%. Reducing the impact of thermal cycling improves performance throughout the panel lifetime. Harvesting the waste heat in the form of stored hot water can replace or offset other water heating methods, saving the end user on utility costs and reducing CO2 emissions in addition to the PV enhancements. Quartet's thermal storage allows users to consume hot water at peak demand time without paying peak demand prices. Icarus is targeting midsize C&I industries as a customer base for Quartet such as multi-family housing, commercial/municipal buildings, hospitals, and hotels, where the cost savings with Quartet will be substantial. Icarus' beachhead market is multi-family housing. The recent restrictions on natural gas appliances in new construction (for example already in California) provides an opportunity for Quartet as an alternative hot water supplier.

Highlights

Accomplishments are vast as borne out by the programs and awards Icarus has completed and achieved, notably "4th Revolution 2023 Product Design of the Year". In addition to that

Financial Info

Raising

\$2M

Valuation

\$15M

Location

Carlsbad, CA, USA

Business Stage

Seed

Business Type

Sustainability, CleanTech , B2B, Energy

Meet the Team



Mark Anderson

CEO

Icarus completed or won:

CalSEED Concept and Prototype Awards (2019 – 2023)

Qualcomm Startup Award (2020)

Cleantech Open (2020)

- Berkely Haas Cleantech to Market (2020)
- Shell Gamechanger by NREL (2020 – 2022)
- California Energy Commission- Bringing Rapid Innovation Development to Green Energy (2021)
- mHub Chicago (2022)
- Upward Labs (2023)
- Rice Clean Energy Accelerator (2023)

All these milestones and awards provide Icarus a massive competitive advantage through mentorship, business leadership and guidance, technical assistance, funding and networking for business development.

Most recently, in March 2023, Icarus was invited by the National Renewable Energy Lab (NREL) to submit a pre-proposal to the Department of Defense (DOD) in March 2023. Trane agreed to serve as the energy services company (ESCO) and co-applicant with Icarus and NREL. As a result, NREL, Icarus, and Trane submitted a full proposal August 17, 2023 (\$1.8 million). We were invited to present the proposal and answer questions for the DOD in Washington DC on September 25, 2023. Trane is involved because if the demo succeeds, they will deploy it rapidly and widely.

Regarding Business Development: The most exciting part is that suddenly we find ourselves among numerous big, very important, and highly supportive players helping us with business development not limited to:

California Energy Commission (CEC): Most of our grant awards (\$1.41 million remaining plus \$2.7 million currently in review) have come from the CEC. Surely our biggest supporter, customer, and stakeholder. The CEC Empower Innovation Network has resulted in at least two new very real net zero project opportunities (ArchNexus and Volumetric Building) described below. This new video was submitted Friday to the CEC.

NREL: Since the Shell Gamechanger by NREL, both NREL and Shell have remained stalwart supporters. Recall that we went to Portugal with Shell last November and are still vetting European prospects from that Summit. Early this year NREL invited us to co-apply with a pre-proposal to the SERDP-ESTCP program of the DOD (described above) which we will present in DC next week.

Upward Labs: We are working closely with Upward Labs and three of their strategic partner/investors Fairstead, UBS, and related real estate. I have met with each at least three times including in person and all three are still considering demonstration projects. I met with Fairstead two additional times in person last week in Vegas, and they are also introducing us to two new commercial real estate developers. Recall also that Upward has reserved an investment in Icarus of up to \$1 million that may be exercised until November. Upward is an extremely valuable resource doing BD work for Icarus.

Projects in progress: We have several other projects already in contract and/or in progress:
The small Del Mar Housing demonstration project.

The 280kW Chula Vista Plant (see Monthly Progress Report with CA Energy Commission, attached)

A 70kW project in Stockton, CA for a net-zero building funded by a grant awarded to Architect ArchNexus. Icarus was selected as one of the high performing/low CO2 emissions renewable energy suppliers. The award has been made. The next funding stage is awaiting approval.

A 90kW project in Tracy, CA, proposed with Volumetric Building Company, not yet funded.

Grant activity: Grants will continue to remain an major factor in Icarus development plans and will continue to play an important role by continuing to provide visibility, validation, and most of all non-dilutive funding. Besides the \$1.8 million NREL/Trane/Icarus/DOD grant above, we also have a \$2.7 million submission in review with the CEC to build a production facility. Once we win a grant to build a facility (there are several options including DOE and CEC), Halliburton's Global Scale Up team will guide us through a methodical approach, starting with outside vendors.

Go-To-Market Strategy

Following comprehensive customer discovery, Icarus is targeting the midsize C&I sector as a customer base for Quartet such as multi-family housing, commercial/municipal buildings, hospitals, and hotels, where the cost savings with Quartet will be substantial. Icarus' beachhead market is multi-family housing in California. The restrictions on natural gas appliances in new construction in California provides an opportunity for Quartet as an alternative hot water supplier. We currently have multiple projects underway, and are in deep discussion in California, and are discussing two projects in Houston, Texas.

Icarus' initial customer base will consist of EPC contractors that sell and install commercial solar PV arrays, and commercial real estate project developers. Icarus will sell the hardware upfront software to the end user for the life of the plant.

The California Energy Commission (CEC) has provided Icarus \$2 million in grants to date, most toward the installation of demonstration projects including a 280-kW project underway now. Through the CEC Empower Innovation Network Icarus has been asked to bid on two additional commercial projects, a 90-kW and a 76-kW.

Through the Shell Gamechanger by NREL, Icarus developed a strong relationship with NREL and was invited to apply to the Department of Defense ESTCP program with NREL and Trane for a \$1.8 million demonstration project.

Upward Labs is a business development accelerator program Icarus is participating in. Upward focuses on the commercial real estate market and has already introduced Icarus to Fairstead, Related and UBS real estate. We have had three to five meetings with these three companies about demonstration projects and are zeroing in on one or more.

What Makes Us Special

Most competitors in this space serve the single-family residential market. Competitors are primarily focused on standalone hybrid panels without retrofit capability, that can only be installed in new arrays or as replacements. Some of the existing single family

home/residential market competitors include SunDrum Solar, Dual Sun, Fafco, and Fegen Solar.

Icarus RT, Inc. decided to focus on the commercial sector and does not have competitors targeting the same market. Icarus' standalone system augments existing PV arrays with minimally invasive solar thermal equipment or can be added on to a new array without interruption to existing plans.