



SPOTLIGHT ON RD&D

The **Research Development & Demonstration (RD&D)** team at SoCalGas is excited to share updates with you on our latest projects, collaborations, and events. Read on to learn about how our involvement in projects such as the Capstone Senior Design Program and thermal particle fluid technology play a part in SoCalGas' mission to become the cleanest, safest and most innovative energy company in America.



Project Spotlight

SoCalGas and Cal State LA's engineering program worked together to help students sharpen their professional skills. The Capstone Senior Design Program presents students with the opportunity to review current real-world engineering challenges. This program helps students become critical thinkers and gain valuable experience that they can carry with them into their careers.

[Learn more](#) about this project as well as other exciting projects from SoCalGas RD&D.

Webinar Spotlight

This quarter, we hosted Gas Technology Institute (GTI) for a webinar about an innovative Thermal Particle Fluid (TPF) that can recover, store, and transport heat for large commercial and industrial processes. By recovering and reusing waste heat, TPFs can reduce fuel demand for large process heat systems, resulting in lower combustion emissions and decreased customer cost. TPF systems could also allow commercial and industrial customers to integrate solar thermal heat resources, further reducing fuel demand and emissions.

[View the recording](#) to learn more about TPFs.

RD&D In the News

Patent recently issued for a technology that RD&D helped develop in collaboration with GTI

SoCalGas and GTI developed a breakthrough industrial drying technology which was [recently granted a patent](#). One of the most energy-intensive operations associated with food processing is drying, which can consume as much as 60 percent of the total energy required to process and transport a food product. An innovative thermal-vacuum drying process can reduce natural gas consumption by as much as 65% and electricity usage by 40%, while recovering substantial amounts of process water.

[Learn more](#) about this innovative technology.

RD&D supported research focusing on the impact of hydrogen blending featured in study

Gas Technology Institute (GTI) published a study in "Progress in Power-to-Gas Energy Systems", an open access journal. The study focused on the impact of hydrogen/natural gas blends on partially premixed combustion equipment. Key trends emerged from the study, such as NOx and CO emissions are flat or decline (air-free or energy-adjusted basis) with increased hydrogen blending. This research was supported by SoCalGas' Customer End-Use Applications RD&D Program through our membership in UTD, a research consortium made up of over 20 North American utilities.

Read the article to [learn more](#).

RD&D alumni company featured in Forbes for their first pilot project

Hyperlight Energy, a SoCalGas RD&D alumni company, was featured in Forbes for their first pilot project, Tectonic Sun Alpha. This project will demonstrate how Hyperlight Energy's concentrated solar thermal technology can use existing oil wells to store renewable energy for months at a time.

Read the article to [learn more](#).

RD&D collaborator recognized as one of the most innovative companies of 2022 by Fast Company

SoCalGas RD&D collaborator Twelve, formerly known as Opus12, was named #3 on the Fast Company "The World's Most Innovative Companies of 2022" list! We collaborated with them on a new process to convert the carbon dioxide in raw biogas to methane in a single electrochemical step, a critical improvement in the science of upgrading biogas to pipeline quality natural gas, and a simpler method of converting excess renewable electricity into storable natural gas. Congratulations, Twelve!

Read the article to [learn more](#).

California Energy Commission (CEC) Notice of Proposed Award (NOPA)

In April 2021, the CEC announced proposed award funding for 3 projects supported by RD&D. The CEC is providing nearly \$5 million to the awardees, with \$1.9 million awarded to USC's catalytic reformer development, and \$750,000 each for the UCLA and Susteon hydrogen production technologies. To show our support, SoCalGas committed a total of \$700,000 to these projects.

USC Catalytic Dry Reforming of Biogas

Technology & Investment Solutions (TIS), USC, CNG Direct, Broadwell Energy, and SoCalGas will advance development of TIS' catalytic reformer system (CRS) to produce hydrogen from organic waste at a demonstration site in Phelan, CA. By integrating existing CRS technology with a water gas shift reactor (WGSR) and small-scale pressure swing adsorption (PSA) system, the technology readiness of this system will mature from Technology Readiness Level (TRL) 4 to TRL 6. The project will field-test a biomass-to-biogas-to-hydrogen pathway at a production capacity of 25 kg hydrogen/day and validate hydrogen production costs of less than \$2.5/kg.

UCLA Direct Solar Conversion of Biogas to Hydrogen and Solid Carbon

UCLA and SoCalGas seeks to scale up a novel, bench-scale, renewable natural gas to hydrogen conversion system that can cost-effectively convert biogas and biomethane into low-carbon hydrogen. The proposed process uses a novel technology that converts solar energy and renewable hydrocarbon gas into clean hydrogen and a high-value form of solid carbon, resulting in zero greenhouse gas (GHG) emissions.

SoCalGas-Susteon CNTP Biogas to Low-Carbon H2 Conversion Project

SoCalGas, in collaboration with Susteon and Build Momentum, seeks to scale up a lab-scale catalytic non-thermal plasma (CNTP) reactor to a bench-scale system powered by renewable electricity that can cost effectively convert biogas into low-carbon hydrogen. This CNTP technology was initially developed by NASA's Jet Propulsion Laboratory and can enable Steam Methane Reformation to occur at substantially lower temperatures — 400 to 500°C instead of 900°C. Thus, this technology dramatically reduces the energy needed to produce syngas from biomethane and convert the syngas to pure hydrogen.

More information on the solicitation and NOPA can be found on [energy.ca.gov](#)

Advance Research Projects Agency – Energy (ARPA-E) Funding Award Announcement

On February 14, 2022, ARPA-E announced funding awards for research and development projects aimed at developing disruptive technologies to strengthen the nation's advanced energy enterprise, including a project supported by RD&D.

Caltech Hybrid Electrochemical and Catalytic Compression System

Caltech, PNNL, Nel Hydrogen, and SoCalGas will design, develop, and evaluate a hybrid electrochemical and catalytic system to directly generate high-pressure hydrogen. The team at Caltech will deliver a bench-scale prototype system that is capable of generating 6.25 g of hydrogen at 700 bar. With support from Nel Hydrogen, the team will also perform techno-economic analysis and demonstrate a reduction in total system cost to produce hydrogen at high pressure when compared to the cost of mechanical or electrochemical pumping.

ARPA-E is providing \$2.2 million to Caltech. To show our support, SoCalGas committed \$300,000 to this project.

More information about the award can be found on [arpa-e.energy.gov](#).

Recently Completed Projects

[Read](#) about all projects that were completed in the last quarter

Connect

[Visit](#) the RD&D Webpage for our Annual Report and other important resources.

Follow SoCalGas RD&D on [LinkedIn](#) for the latest updates on upcoming webinars and exciting new projects.

[Connect](#) with us on CEC's Empower Innovation Platform to accelerate your work and advance a clean economy for all.

Have a question? Email us at RDDInfo@socalgas.com.

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