

DR21.01 DR-TTC Dynamic HVAC Test Chamber

Overview



SCE Technology Test Center (TTC)

The SCE's Technology Test Center (TTC) evaluates a variety of technologies in controlled environments that mirror real-world conditions and customer experiences. This generates comprehensive performance data and innovative test methods which are used by SCE customers, policymakers, and utility programs to make informed decisions regarding the investment and application of cleaner technologies. The TTC is pursuing a major renovation project to the facility layout and is pursuing updates to its testing capabilities.

The current ratings for residential/small commercial HVAC systems are based on traditional steady state lab test methods that are not sufficiently representative of field performance. Dynamic testing or load-based testing is necessary to better characterize the performance of the actual advanced controls of these heat pump systems. TTC seeks to build an environmental test chamber capable of advanced dynamic HVAC testing at the facility in Irwindale, CA.

Current TTC HVAC lab test capabilities are limited to steady state methods that disable native HVAC controls. A dynamic test method in the lab produces metrics/results that include operation of native controls. It is important to find out if various test methods in the lab can provide ratings representative of field performance when equipment is operated under its own controls and under loads that vary with ambient temperature. Additionally, the test chamber could also be used to test other small commercial self-contained refrigeration equipment.

Project objectives are:

- Construct an environmental test chamber capable of advanced dynamic HVAC testing.
- Demonstrate a dynamic test and generate sample test data.
- Identify and prioritize near-term potential test projects, which may include but is not limited to: the Advanced Heat Pump Coalition's Heat Pump Rating Representativeness Validation Project, LBNL projects HIL and HP-Flex (A framework to characterize the performance of building components in providing flexible loads and building services using a hardware-in-the-loop approach, Next Generation Heat Pump Load Flexibility), F-Gas Reduction Incentive Program.

The project is co-funded under the EM&T Technology Assessments and Technology Transfer investment categories, as there are elements of both research goals in this study. The Technology Assessments category assesses and reviews the performance of DR-enabling technologies through lab and field tests and demonstrations designed to verify or enable DR technical capabilities. The Technology Transfer category advances DR-enabling technologies to the next step in the adoption process by raising awareness, developing capabilities, and informing stakeholders during the early stages of emerging technology development for potential DR program and product offerings.

Collaboration

The project is being co-funded by the Technology Test Centers, the SCE Emerging Technologies program, and the SCE Codes and Standards program.

Results/Status

Overall renovation of the facility layout was completed in Q4 2022. National supply chain issues are expected to continue to delay forecasted equipment procurement timelines beyond the planned construction schedule. The project team is actively exploring feasible test chamber build options using alternate pathways to build upon existing equipment and retrofit chamber controls. Completion of test chamber planning and vendor selection is targeted for Q4 2023.

Next Steps

Dynamic test chamber planning will be finalized Q4 2023. The project targets dynamic test chamber completion by Q4 2024.