FACT SHEET

Commercial Rooftop Units

Nationwide, commercial rooftop units (CRTUs) make up approximately 37% of commercial buildings HVAC systems, and 50% of all commercial buildings' floorspace.[1] According to the Northwest Energy Efficiency Alliance, more efficient CRTUs with remote monitoring capabilities can achieve 10-40% energy savings compared to standard CRTUs.[2] Nevertheless, product availability and adoption of these units remains low.

CalMTA is investigating a potential market transformation initiative (MTI) to increase the heating and cooling efficiency in California's commercial buildings by accelerating market adoption of more efficient CRTUs across the state. We envision a future state in which remote monitoring and controls, including automated fault detection and diagnostics (AFDD), app-based startup commissioning, and remote access capabilities are integrated into CRTUs, and a skilled and diverse workforce exists to service and install the equipment.

The opportunity

In California, both the new construction and replacement markets have long been dominated by mixed-fuel CRTUs that combine a cooling-only compressor system with a gas furnace. More recently, existing and proposed policies and programs are beginning to drive heat pump CRTUs into the market.[3]

Photo credit: Helios

[1]CaraDonna, Chris et al. 2018 COMMERCIAL BUILDINGS ENERGY CONSUMPTION SURVEY (CBECS). Energy Information Agency. https://www.eia.gov/consumption/commercial/

[2]NEEA Q4 2022 Quarterly Report. https://neea.org/resources/neea-q4-2022-quarterly-report

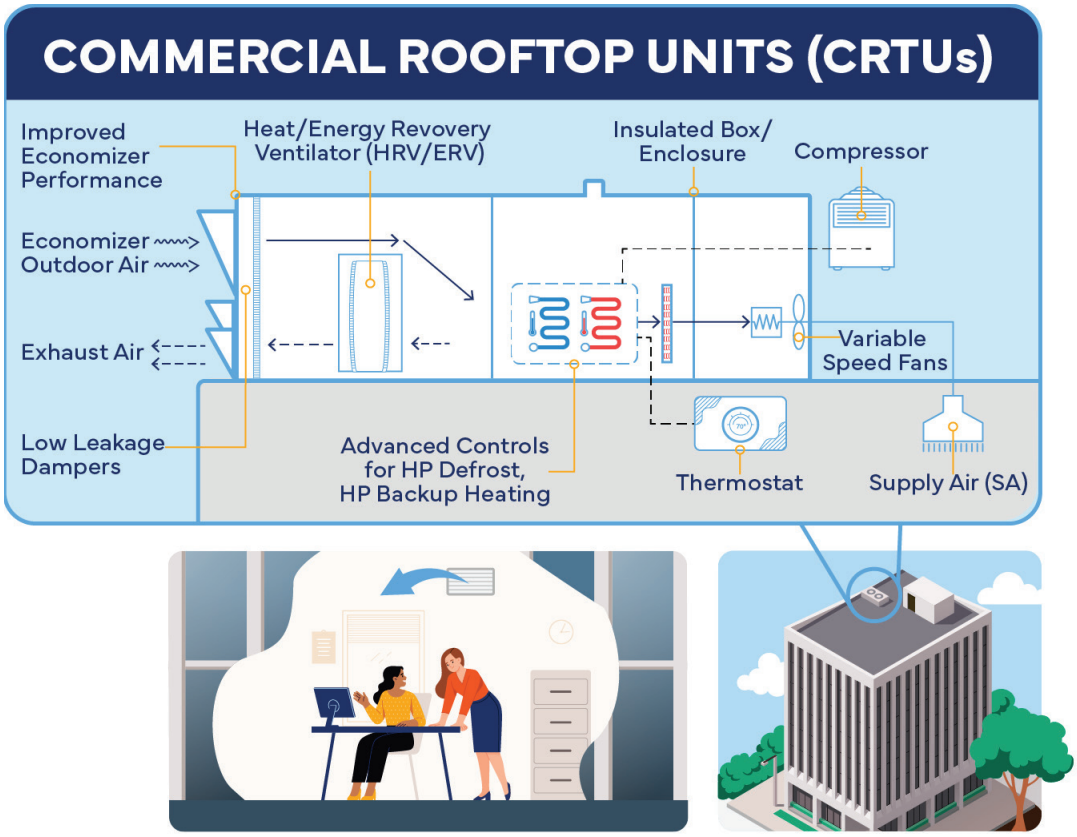
[3] Kurt, Dylan. Heat Pump RTUs Taking Center Stage in Expanding Market. ACHR News. https://www.achrnews.com/articles/154396-heat-pump-rtus-taking-center-stage-in-expanding-market

An opportunity exists to increase CRTU product efficiency while creating a new network of skilled and trained technicians to install and maintain these products. CalMTA is currently assessing the viability of collaborations with market actors, current HVAC efficiency programs, the California Codes and Standards Advocacy team, and several market transformation efforts outside of the state to accelerate the acceptance of more efficient equipment, influence manufacturer product lifecycles, and support the continued advancement of codes and standards.

The technology

CRTUs are single-zone, 3- and 20-ton packaged forced-air, heating, ventilation, and air-conditioning (HVAC) systems that are installed on the roof of small- to medium-sized non-residential buildings. Several measures are under research that could be implemented to increase the efficiency of these products:

- Increase installed efficiency through improved startup, commissioning, and compliance with Title 24 Acceptance Testing requirements
- Optimize long-term operational efficiency through predictive analytics and machine learning
- Remotely monitor CRTU performance to detect, diagnose, and resolve faults by providing alerts to owners and actionable information to HVAC technicians



The CalMTA team is conducting energy modeling and testing to understand the energy efficiency and decarbonization opportunities specific to California climate zones. This work will assess equipment performance, the benefits of recovery systems, component sizing, emission impacts, and lifecycle testing.

MT Strategy

This MTI will target existing small-to-medium non-residential buildings that utilize 3- to 20-ton single zone CRTUs. In order to achieve lasting change in the market, CalMTA is developing market intervention strategies to overcome identified market barriers.

Identified market barriers

- Low product availability
- Minimal perceived benefit to manufacturers in advancing CRTUs
- Lack of cost parity with other options
- Ineffective product differentiation
- Complex installation techniques

Market interventions and leverage opportunities

- Engage manufacturers to realize needed product development, availability of affordable products, and product specifications that support better equipment design and purchase decisions
- Partner with distributors and manufacturer representatives to drive adoption and support education and acceptance among contractors
- Initiate workforce development, marketing tactics, and incentives to motivate the supply chain to promote and sell more efficient CRTUs with improved controls
- Leverage other market transformation and research efforts, such as CalNEXT, in California and at the national level, to create cost-sharing opportunities, product specifications, and market outreach
- Increase the use of more efficient CRTUs in both new construction and alterations by providing data and analysis from MTI pilots and programs to the California Codes and Standards Advocacy team and subject matter experts
- Capitalize on low global warming potential refrigerant requirements to accelerate replacement of CRTUs instead of continuing to repair or recharge inefficient units

Applying an equity lens

In addition to these interventions, CalMTA will seek to create higher wage jobs for environmental and social justice (ESJ) communities through the workforce development efforts in this potential MTI. Key outcomes for equity and workforce development include leveraging incentives and other cost-reduction strategies to support installation of CRTU equipment in ESJ communities, and partnering with trusted allies in ESJ communities to establish a network of skilled installation technicians through workforce development, education, and training.

About CalMTA

CalMTA is a program of the California Public Utilities Commission and is administered by Resource Innovations. We are creating a market transformation (MT) portfolio for California that will deliver cost-effective energy efficiency and decarbonization. Market transformation is the strategic process of intervening in a market to create lasting change by removing market barriers or exploiting opportunities, accelerating the adoption of identified technologies or practices.

Learn more: calmta.org Follow us: showcase/calmta

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