



Technical Specification for Very High-Efficiency HVAC

Technology Overview

When heating, ventilation, and air conditioning (HVAC) system repairs are required, it is standard practice to replace individual HVAC components piece-by-piece, limiting the opportunity to improve overall system efficiency. Very high efficiency (VHE) HVAC is a performance-based technical specification that reconsiders the whole system to enhance efficiency and lower costs.

The specification for VHE HVAC separates the heating and cooling function from the ventilation function to optimize the efficiency of each. Zones are created throughout the building, allowing precise control of the whole system. Heating and cooling zones are defined by thermal load while occupancy patterns define ventilation zones. High performance energy recovery ventilation (ERV) equipment recovers energy as conditioned air flows out of the building, reducing energy loss and demand. As fresh air flows into the building, it is pre-conditioned with captured energy from the ERV. VHE HVAC systems remove more than 80% of the thermal ventilation load and have reduced HVAC-related energy by an average of 70% in vendor-provided case studies.

Why is GSA Interested?

The VHE HVAC specification can help achieve full electrification of buildings without upgrading the existing electrical service. A vendor-provided case study showed a 100% reduction in natural gas use for HVAC and reduced electricity use and demand.

VHE HVAC systems provide 100% outside air with no recirculation of ventilation air, improving indoor air quality and occupancy comfort.

Deployment Potential

Buildings in need of extensive HVAC repairs or total replacement are ideal for the VHE HVAC approach. The spec works with any pre-existing HVAC system, including rooftop units, small unitary systems, boilers and furnaces. Existing ductwork can typically be repurposed for ventilation-only use. Adding required ductwork may increase total cost.

The VHE HVAC specification is typically suited to 6-story buildings or smaller, although implementation can be successful in taller buildings if floor-by-floor zoning can be achieved.

Green Proving Ground (GPG), in collaboration with the U.S. Department of Energy, is evaluating the real-world performance of very high efficiency HVAC in federally owned buildings within GSA's inventory. The technology will be provided by Institute for Market Transformation and coordinated with other ongoing evaluations of this technology.