

# The Green Status of Fire Stations in the US: Preliminary Results

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Fire protection is an essential public service, but also one of the most costly ones. A considerable amount of resources is devoted to fire protection including equipment, staff, training, and facilities. Fire stations, in particular, have a significant cost impact on state and municipal budgets. Currently, the U.S. Fire Administration estimates that there are approximately 50,700 fire stations. Fire departments can act as innovative leaders in green practices within their communities and at the same time save operational cost. According to a report from the National Volunteer Fire Council, an investment increase of 2% of the base design and construction budget can lead to 20% savings in the total lifespan of fire stations. Specifically, green rating systems such as the USGBC's LEED system has been used in the U.S. to assess green buildings. However, a nationwide study analyzing the green status of this type of projects has not been found. This study aims to analyze current status of 76 certified fire stations under the LEED NC v2009 rating system that are located across the U.S. and identify the preferred categories targeted for achieving the certification. The LEED system establishes benchmarks that define and measure green buildings using a standardized set of building metrics and rating criteria. LEED uses seven categories to rate the buildings: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, Innovation in Design, and Regional Priority Buildings. LEED provides a checklist that can be matched with a LEED scorecard which becomes the record of points and rating level achieved after the project is submitted to GBCI for a rating. Thus, this study will report preliminary results about these 76 fire stations, which will serve as a baseline to further study the operational efficiency and practicality of designed green initiatives for the fire stations in another research phase. A scorecard analysis (credits and points) of public data available serve as the foundation to describe the current status of green design and construction of these fire stations. To better understand the design and construction strategies for these fire stations, case studies from public records will be evaluated to double check the impact of these green strategies. Preliminary findings suggest that the Material Resources (MR) credits were achieved at the smallest rate, on average 37%. Also, the Energy and Atmosphere (EA) credits have one of the lowest achievement rate, equal to 41%. On the other hand, Indoor Environmental Quality (IEQ) and Water Efficiency (WE) credits were obtained at the highest rate, on average about 65% in both cases. The commitment to ensure public safety through fire stations has significant costs that are typically borne by public funding and support mechanisms that demand systematic and effective oversight. If money can be saved during operation phases by having energy efficient fire stations, these funds can be invested in other areas such as training and hiring new personnel. The significance of this study is to describe the green practices that have been applied during design and construction to fire stations and create a baseline that can be used as future analysis during the operation phase. At the same time, we expect to discover the challenges when building these facilities.

**Key Words:** LEED, Fire Stations, Green Buildings, Design, Construction