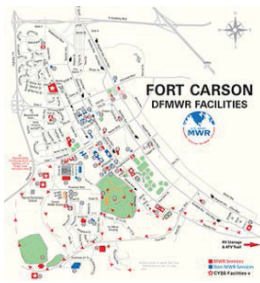


46%

WATER SAVINGS  
ONE IRRIGATION  
SEASON



# FORT CARSON FAMILY HOUSING ADVANCES ON NET ZERO WITH ETWATER

The Army Net Zero initiative was launched in October 2010 to establish long-term sustainability practices and incorporate technology to better manage energy, water and waste at Army installations. The Army Net Zero water strategy aims to balance water availability and use to secure a sustainable supply for years to come in recognition that water scarcity is a serious and growing issue in many parts of the United States, and around the world. Eight Army installations of different physical sizes, geographic locations and commands were selected to be Net Zero pilot sites for water, including Fort Carson, located near Colorado Springs, CO.

Site-specific Net Zero water objectives were identified for each installation with implementation of irrigation efficiency designated as a priority at Fort Carson. The ETwater cloud-based platform and water management system was chosen as the technology solution for the on post Fort Carson Family Housing. ETwater eliminated outdoor water waste on the irrigation for the landscaped areas of Fort Carson’s family housing by over 46% within the first irrigation season in support of the aggressive Army Net Zero timeline and water reduction goals established for all pilot sites.



Source: Army Net Zero Water Balance and Roadmap Programmatic Summary

## SECURING A SUSTAINABLE WATER SUPPLY FOR YEARS TO COME

The Army broadly defines a Net Zero water installation as one that “limits the consumption of freshwater resources and returns to the same watershed so as not to deplete the groundwater and surface water resources of the region in both quantity and quality over the course of a year.” The Army has set the goal for all pilot sites to accelerate their reduction of potable water use intensity (WUI), measured in gallons per square foot (gal/sq. ft.) of gross building area, by 50% from fiscal year (FY) 2007 to FY 2020. Fort Carson is one of the four largest potable water users in the Net Zero water, which accounts for 86% total of potable water used by all pilot installations.

Fort Carson, “The Mountain Post,” is located just south of Colorado Springs at the base of the Rocky Mountains and covers 137,000 acres. It has consumed an annual average of 853 Mgal

(millions of gallons) across the entire installation from FY 2008 through FY 2011, with 353 Mgal annually directly used (indoors and outdoors combined) by the family housing on post. Historically, 33% of the Fort Carson family housing water use is on landscape irrigation, which totaled 133 Mgal in FY 2012. It resides in a region that has been experiencing a drought that is expected to continue for the foreseeable future. Local water utility companies have responded by enacting water restrictions and charging peak demand prices during the peak season, which for Fort Carson is May through September and increases primarily due to landscape irrigation. Additionally, the price of water in the region is anticipated to rise over 80% by 2020.

The top four water users at Fort Carson are on-post irrigation (excluding family housing irrigation), plumbing fixtures in family housing, on-post plumbing fixtures (laundry and kitchen), and family housing irrigation. These four water uses total 87% of water consumption at Fort Carson (see graph).\* The Fort Carson family housing for a base population of about 13,000 is privatized and managed by Balfour Beatty Communities, a leading Public-Private Partnership (PPP) developer and property management company for military family housing. Balfour Beatty Communities was recipient of the Association of Defense Communities (ADC) 2012 Energy and Sustainability Partner of the Year Award in recognition for achieving Department of Defense energy efficiency/sustainability goals.

## INCORPORATING TECHNOLOGY TO BETTER MANAGE WATER

Balfour Beatty Communities converted the Fort Carson Family Housing standard, conventional irrigation system to the ETwater complete, cloud-based 'smart irrigation' system in the first quarter of 2013, which became effective immediately at the commencement of the irrigation season that April/May. ETwater was selected for its innovative technology and over a decade of experience working with U.S. businesses, municipalities and HOAs to help reduce and optimize their water consumption. ETwater holds several key patents on smart irrigation technology and was the first company to obtain the Irrigation Association SWAT (Smart Water Application Testing) in 2004, and is EPA WaterSense certified. The ETwater cloud-based system dynamically, predictably and automatically controls landscape watering schedules based on weather forecast, plant types, soil, microclimate and other environmental data. Field-based smart devices connect wirelessly to the ETwater server to exchange schedules and data, and then execute daily irrigation schedules through the existing irrigation infrastructure. It is also a cost-effective solution in its operational design without reliance upon site sensors or subject to any single-point of failure hardware and maintenance.

Fort Carson Family Housing exceeded savings in its implementation of ETwater to both mitigate risks in the regional water supply as well as a successful trial for meeting Army Net Zero water reduction in the greater Fort Carson on post irrigation. A peak efficient year in 2013 was achieved by Fort Carson Family Housing of 46% less water used on landscaping for impressive savings of over 108 Mgal compared to prior year's annual 133 Mgal total consumption. This also resulted in a payback on investment in the cost of the ETwater system in a single season—a full year ahead of an initial projection of two irrigation seasons. Continued success in subsequent years to build on the peak 2013 efficiency savings was nominally compromised by instances where on site landscapers switched off the system, or inputted their own manual irrigation settings. In the Army Net Zero October 2013 "Water Balance and Programmatic Summary" this issue is highlighted and advocates "changes in how people use water need to be implemented in conjunction with any technological solution. Without these changes, further reductions in potable water use cannot be realized."

## SAVING MORE POTABLE WATER AND ATTAINING ARMY NET ZERO WATER COMPLIANCE

The cost of water from the Colorado Springs Utility (CSU) to Fort Carson Family Housing markedly increased between 2012 and 2013, rising from \$5.64 to \$7.10 per Kgal, with subsequent annual increases to \$7.54 and \$7.61 per Kgal in 2014 and 2015 respectively. ETwater effectively managed the significant rise in water pricing to cumulatively save Fort Carson Family Housing \$789,280 over the 3-year period 2013-2015 on a \$3M plus expense for water they would have incurred otherwise through their pre-2013 traditional irrigation methods.

While the largest discretionary use of potable water at Fort Carson is in irrigation, it also offers the most significant opportunity for ETwater technology to obtain more marginal savings in water, labor and costs for them of up to 50% or greater, along with Army Net Zero water compliance by the 2020 end date.



\* Because Fort Carson's on post family housing is privatized its water use is excluded and not reported by Fort Carson to the Army.