

# SUSTAINABLE FORT CARSON

= ANNUAL REPORT 2011 =



# ACHIEVING OUR VISION



## SUSTAINABILITY IS MISSION CRITICAL



**DAVID L. GROSSO**  
**COLONEL, U.S. ARMY**  
**GARRISON COMMANDER**

After nearly 10 years on the Sustainability frontier, Fort Carson continues to pioneer new paths in our journey. With a resolute blend of strategy, creativity and technology, each day we break new ground in our quest and energize positive change at Fort Carson.

In April 2011, Fort Carson was chosen by the Assistant Secretary of the Army for Installations, Energy and Environment as a pilot Net Zero Installation for Energy, Water and Waste. The goal is for Fort Carson to produce as much energy and water as it consumes, with zero waste to the landfill. This “Triple Net 0” designation essentially accelerates our vision by seven years—the original 2027 goals are now 2020 goals.

Sustainability is Mission Critical. With that in mind, we take on the Triple Net 0 challenge for the benefit of the total Army family, the environment, neighboring communities, the mission and all those who sustain the mission.

To reach our goals, we must continue to pull together in the same direction—and stay Army Strong today and tomorrow!

Mission

Environment

Community

Economy



# OUR GOALS

The 7 Sustainability goals, adopted with input from internal and external stakeholders, provide the roadmap to achieve our vision of a sustainable installation. The goal plans are living documents relevant to current conditions, challenges, innovations and opportunities, and thus are continuously reviewed via five-year objectives and two-year work plans. Goal plans are integrated into other installation plans. The original vision to achieve Sustainable Fort Carson by 2027 changed to 2020 when Fort Carson became a Net Zero pilot Installation for Energy, Water and Waste in 2011. Following are the original goals.



## Energy & Water Resources

Sustain all facility and mobility systems from renewable sources and reduce total water purchased from outside sources by 75% by 2027



## Zero Waste

Total weight of solid and hazardous waste disposed of is reduced to zero by 2027, and every year thereafter



## Air Quality

Reduce installation greenhouse gases (scope 1, 2 and 3) and other air pollutants to the lowest achievable emission rates



## Sustainable Development

Create a community that encourages social, civic and physical activity while protecting the environment



## Sustainable Procurement

All DOD and Fort Carson procurement actions support sustainability



## Sustainable Transportation

Reduce automobile dependency and provide balanced land use and transportation systems



## Sustainable Training Lands

Training ranges; maneuver lands; and associated air space capable of supporting current and future military training to standard while maintaining and sustaining training resources

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# OVERALL GOAL PROGRESS

The color-coded state of each section (red/amber/green) is a snapshot of how well Fort Carson is achieving its desired outcomes for a particular metric or goal. The determination is made by the Installation Sustainability Resource Officer, and presented to the Garrison Commander routinely.

	Status	Outlook
 Energy & Water Resources		
 Zero Waste		
 Air Quality		
 Sustainable Development		
 Sustainable Procurement		
 Sustainable Transportation		
 Sustainable Training Lands		

 Success in achieving a goal or successful movement along a predetermined timeline within a goal plan.

 Positive movement toward goal objective or timeline is quantifiable, but not yet achieved.

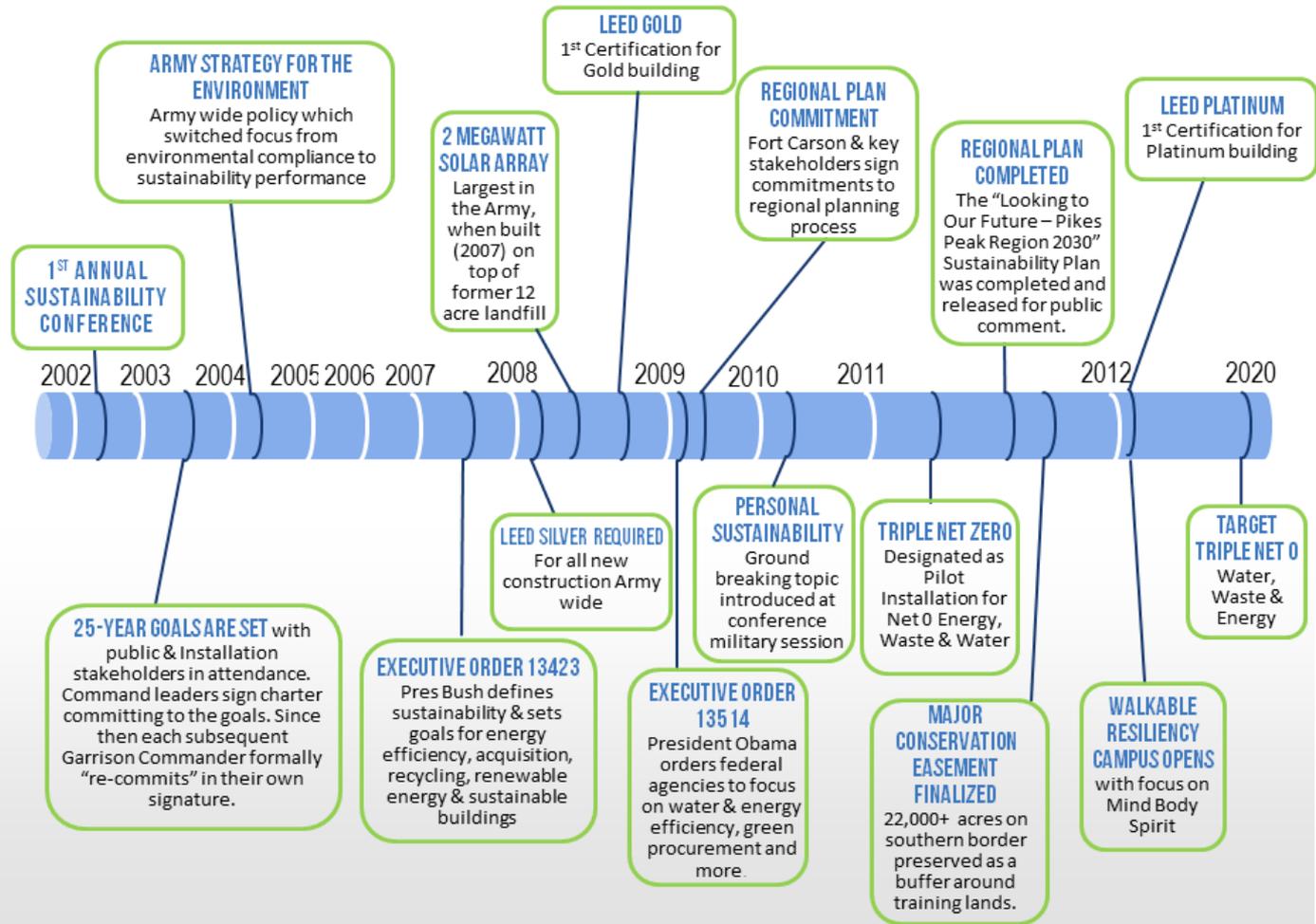
 Significant impediments to goal objective or timeline exists. Future success in jeopardy.

# OUR HISTORY

This timeline illustrates Fort Carson's **10 YEAR JOURNEY** on the sustainability frontier as a **LEADER** and **CHANGE AGENT** in the Army and the region.

Sustainability successes on Fort Carson have been and continue to be a **MODEL** and **CATALYST** for regional progress and installations around the nation in developing their own goals in **PARTNERSHIP** with their surrounding communities.

Sustainable Fort Carson is **DEEPLY ROOTED** in a tradition of strong environmental **STEWARDSHIP**, leadership and commitment that has grown over the last **30+ YEARS**. We are thankful for our long history of **COMMAND SUPPORT** and dedicated staff who championed our progress every step of the way.



Mission

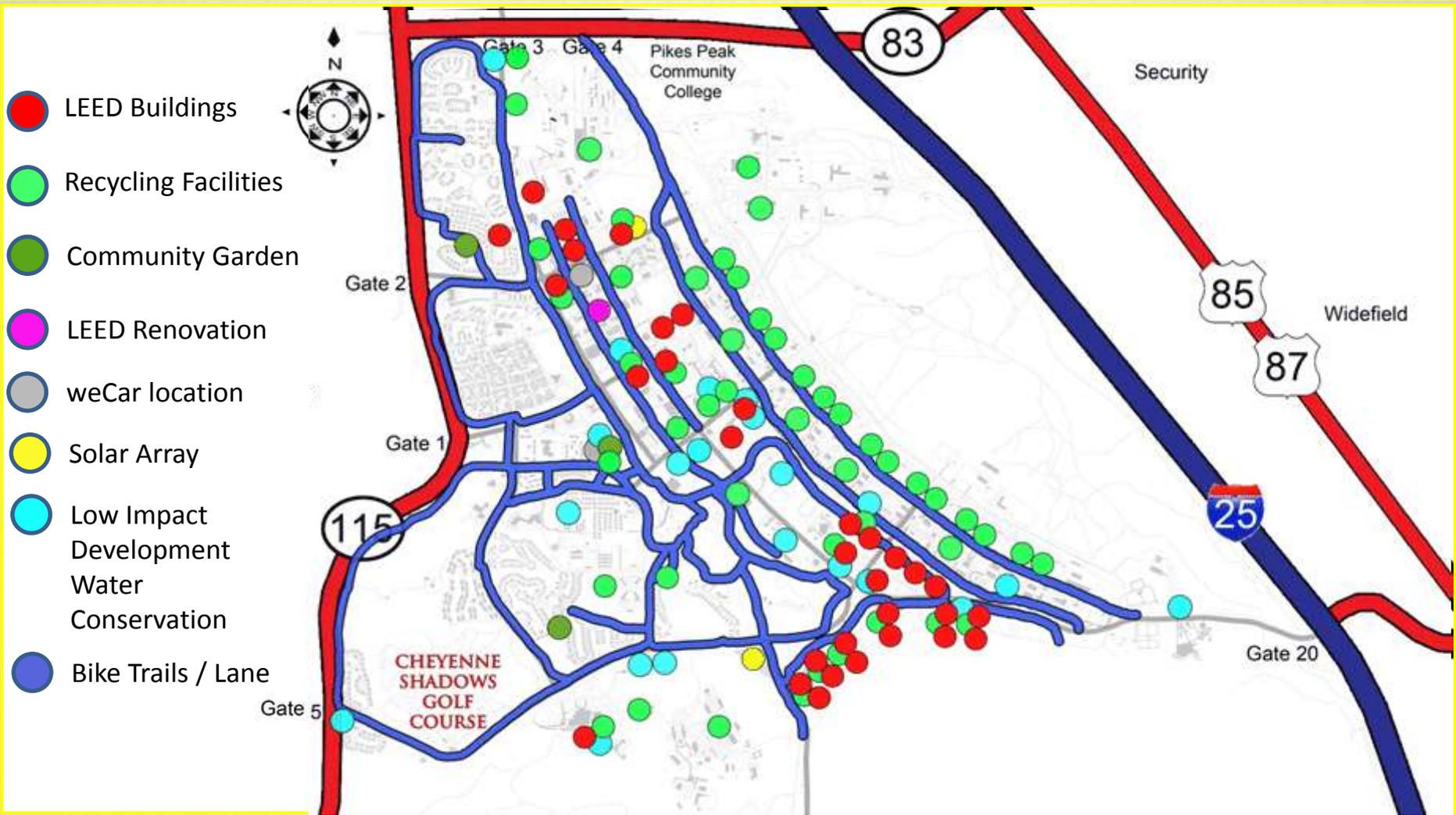
Environment

Community

Economy



# ACHIEVEMENTS



Mission

Environment

Community

Economy



# LEADING ON THE CUTTING EDGE

In 2011, Fort Carson was designated as a pilot Net Zero Installation for Energy, Water and Waste (“Triple Net 0”) by the Assistant Secretary of the Army for Installations, Energy and Environment.



**“STRIVING FOR NET ZERO IS OPERATIONALLY NECESSARY, FINANCIALLY PRUDENT, AND CRITICAL TO OUR MISSION.”**

**Honorable Katherine Hammack, Assistant Secretary of the Army for Installations, Energy and Environment**

Mission

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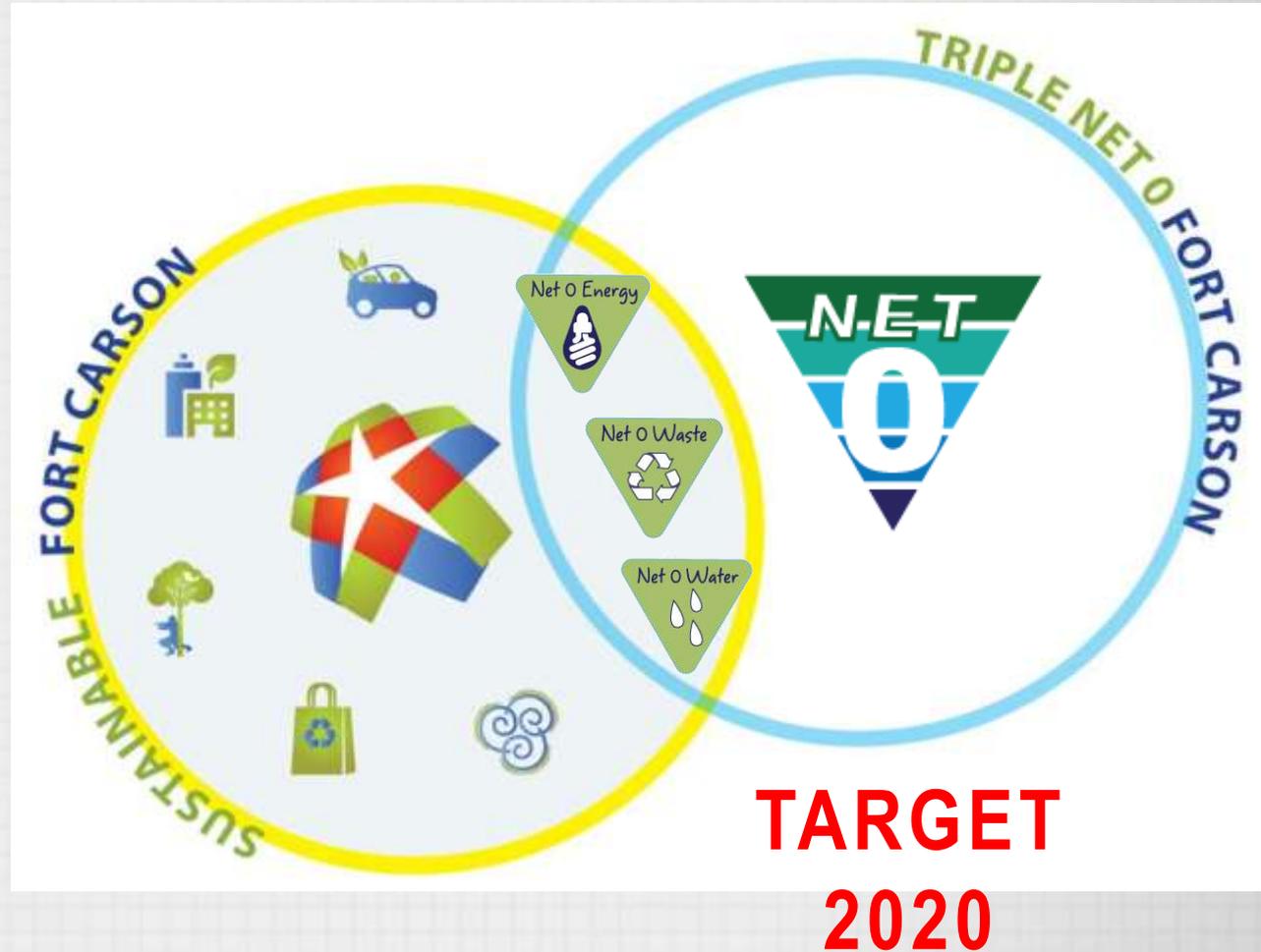


# SUSTAINABILITY & NET ZERO

Our vision is powered by the recognition of our obligation to ensure that our Soldiers today – and the Soldiers of the future – have the land, water, and air resources they need to train; a healthy environment in which to live; and the support of local communities and the American people.

Our 7 Sustainability goals provide the roadmap to achieve our vision. Net Zero supports sustainability goals.

This document reports the progress of sustainability goals while demonstrating how they are integral to the success of Net Zero.



# TRIPLE



# INSTALLATION



Produce as much energy onsite as it uses over the course of a year.

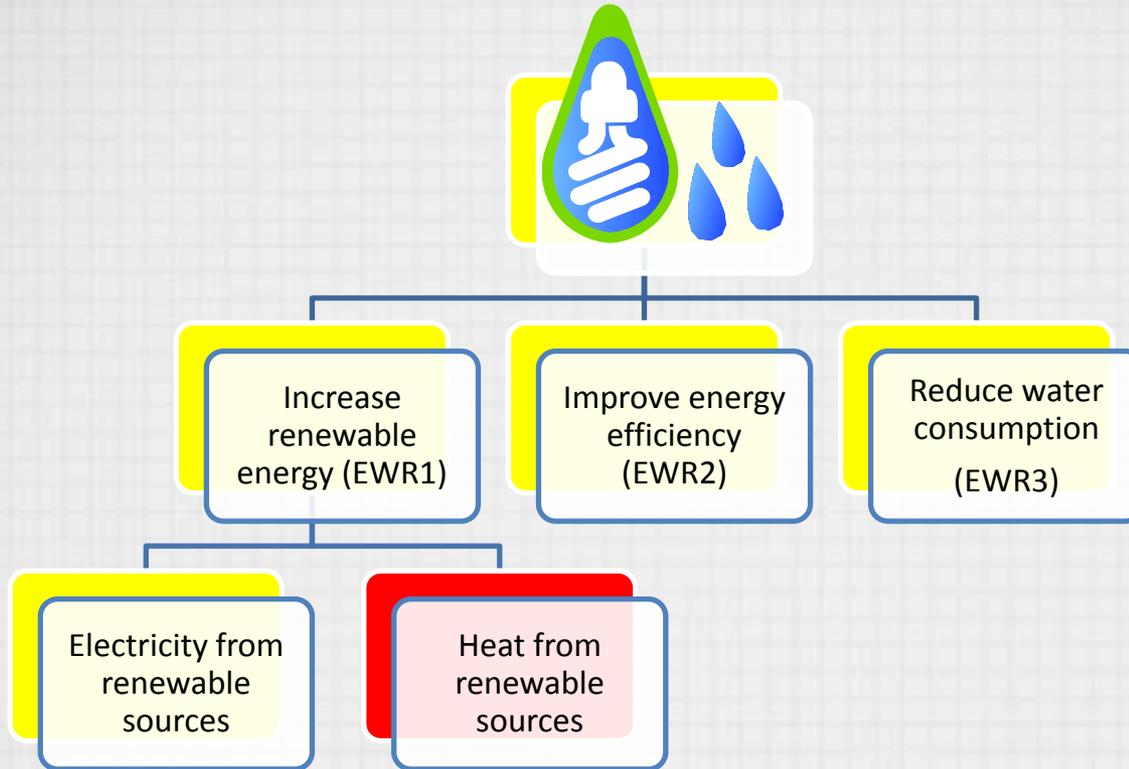


Limit the consumption of freshwater resources and return water back to the same watershed so not to deplete the groundwater and surface water resources in quantity or quality over the course of a year.



Reduce, reuse and recover waste streams, converting them to resource values with zero waste to landfill over the course of a year.

# ENERGY & WATER



## OVERALL ASSESSMENT



**CHALLENGES** Population growth, Increase in building square footage, Intensity of use, Resource availability, Communicating policies & Educating a shifting population, User behavior, Net Zero by 2020

## OUTLOOK



**OPPORTUNITIES** Enhanced opportunities for innovative public private partnerships as a result of recent designation as a Net Zero Installation for Energy, Water and Waste.

Mission

Environment

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Economy



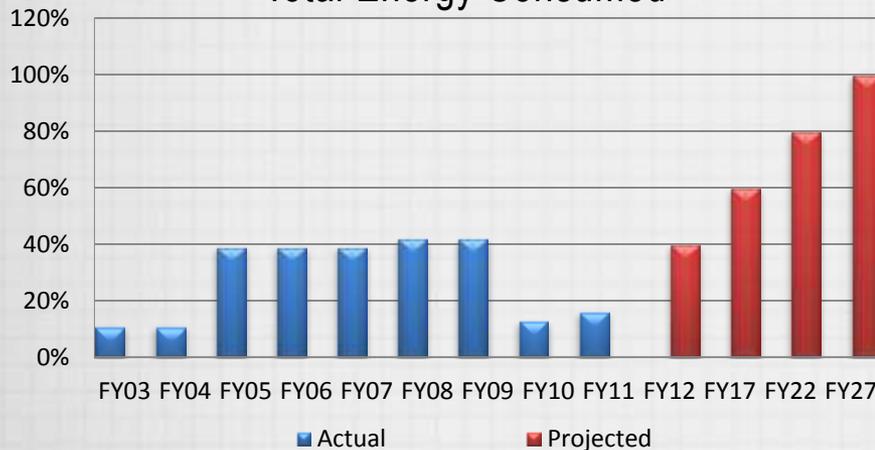
# ENERGY & WATER



## OBJECTIVE

Increase Renewable Energy Use In Facilities.

Renewable Energy Use vs.  
Total Energy Consumed



*Renewable energy is defined as energy from non-petroleum sources such as wind, hydro and solar power. The chart includes energy generation onsite and the purchase of RECs (Renewable Energy Credits)*

## PROGRESS

Currently the Installation receives or offsets approximately 16% of its energy needs from renewable sources and 3.2% is generated onsite.

The FY12 objective is to receive or offset 40% renewable energy as compared to total energy consumed. Achieving the FY12 objective is unlikely due to economic conditions that make energy efficiency projects (Objective EWR2) a more attractive return on investment at this time.

As a Net Zero Energy Installation, our goal is 100% renewable energy – to generate as much energy as is consumed onsite over the course of a year by 2020.

# ENERGY & WATER

FISCAL YEAR 2011 (FY11)

## RENEWABLE ENERGY PROJECTS

- Partnered with the U.S. Army Corps of Engineers to include integrated renewable energy systems such as solar hot water, photovoltaic and ground source heat pumps in new construction. Over 1.1 MW (megawatts) photovoltaic implemented in new construction.
- Partnered with U.S. Army Environmental Command (AEC) to initiate a Net Zero Environmental Assessment for over a dozen potential renewable energy sites.
- Used grant funds under the Environmental Security Technology Certification Program (ESTCP) to demonstrate a combined heat and power Infinia\* solar dish and a Biomax\* biomass system.

\* Fort Carson in no way implies federal endorsement of the organizations or companies mentioned in this report.



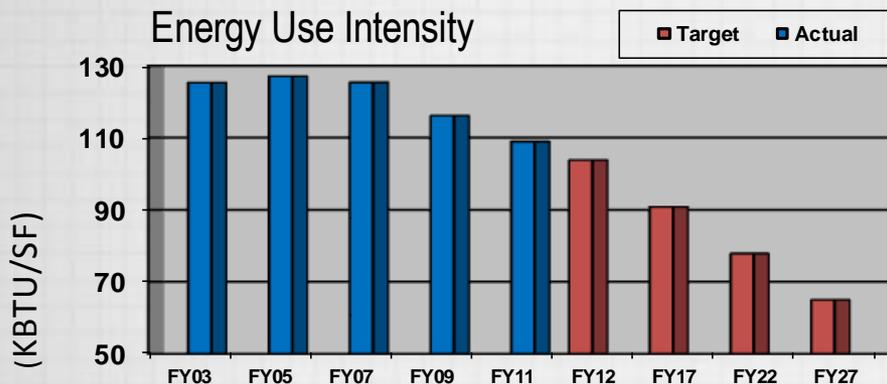
*These photovoltaic carports offer shade and weather protection for approximately 150 vehicles, while providing a charging station for electric vehicles, or any other electrical need. Excess electricity generated goes into the electrical grid.*

# ENERGY & WATER



## OBJECTIVE

Improve Facility Energy Efficiency By Reducing Energy Use Per Square Foot.



• Energy Use Intensity, measured in thousands of British Thermal Units per square foot (KBTU/SF) is the combined energy use of natural gas and electricity per square foot of floor space. This metric does not including housing, which is privatized.

Energy efficiency is expressed on a square footage basis (as opposed to a per capita basis) due to rapid population growth and deployments / return of Soldiers.

## PROGRESS

Energy Use Intensity<sup>•</sup> reduced from a FY03 baseline of 125.3 KBTU/SF to 108.5 KBTU/SF in FY11, which is an efficiency improvement of 13.4%.

The installation is on target to meet the federal goal of 30% reduction by FY15.

Optimizing building energy efficiency is a key strategy for achieving Net Zero Energy by 2020.

# ENERGY & WATER

## FY11 ENERGY EFFICIENCY PROJECTS

- Retrofitted high bay lights in multiple facilities.
- Completed several interior and exterior demonstrations of light emitting diode (LED) lighting.
- Replaced aging air conditioners and chillers.
- Partnered with the U.S. Army Corps of Engineers to field/develop Meter Data Management System (MDMS) that allows for performance tracking and measurement.
- Connected smart meters and repaired old meters.
- Partnered with the U.S. Army Construction Engineering Research Laboratory (CERL) to develop a Net Zero ready Central Energy Plant concept for the proposed Combat Aviation Brigade site.



*Achieved 30% or greater energy efficiency performance over ASHRAE (American Society of Heating, Refrigeration and Air-Conditioning Engineers) standard in several newly constructed facilities.*

# ENERGY & WATER



*A Net Zero Energy Installation produces as much energy onsite as it uses over the course of a year.*

*Fort Carson's recent designation as a pilot Net Zero Installation accelerates the timeline for Fort Carson to be powered by 100% renewable energy to 2020 from 2027.*

## STRATEGIES TOWARD NET ZERO ENERGY

- Continue valuable partnerships with National Renewable Energy Laboratory (NREL) and U.S. Army Construction Engineering Research Laboratory (CERL).
- Work with Johnson Controls, Energy Savings Performance Contractor (ESPC), to finance high payback conservation opportunities.
- Design new facilities with a focus on energy efficiency.
- Maximize energy efficiency of existing buildings.
- Continue development and beneficial use of Army MDMS system.
- Continue energy audits and scorecards to increase efficiency.
- Program FY13 Energy Conservation Investment Program (ECIP) projects such as a small biomass boiler and re-commissioning opportunities.
- Enhance public – private partnerships.
- Elevate awareness of Net Zero Energy policies by daily briefings to incoming Soldiers.

## CHALLENGES TO NET ZERO ENERGY

- Low utility rates have a negative impact on life-cycle cost analysis.
- Improving energy efficiency and reducing overall energy demand on a rapidly growing Installation.
- Producing all energy needs on site.

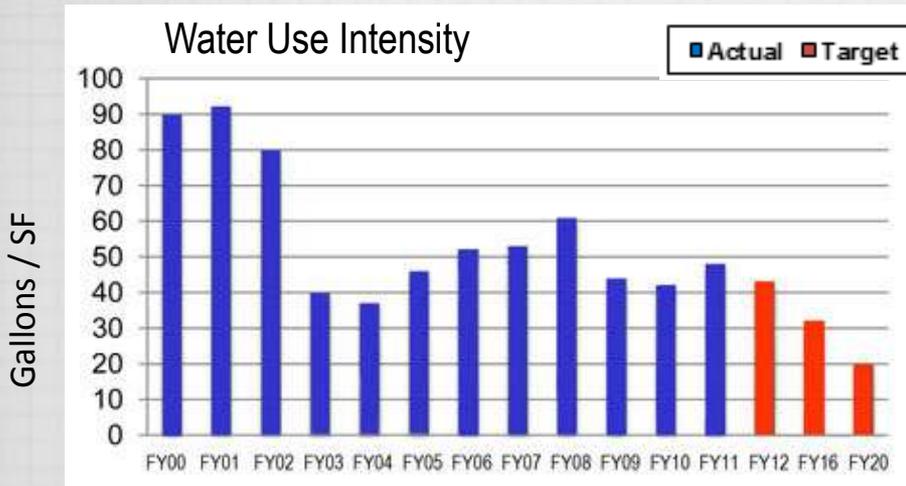
**“WITHOUT ENERGY THE ARMY STANDS STILL AND SILENT.”** General Peter Chiarelli, Army Vice Chief of Staff

# ENERGY & WATER



## OBJECTIVE

Reduce The Amount Of Potable Water Consumed.



• Water Intensity is water use per square foot, not including housing which is privatized.

## PROGRESS

From an established FY02 baseline, water intensity • decreased 47% by the end of FY11.

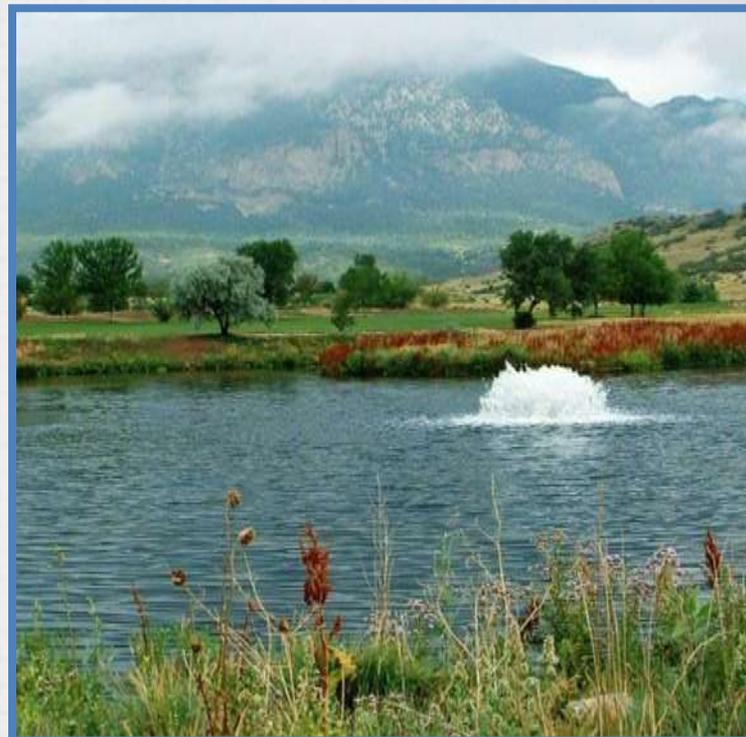
The FY12 objective is a 45% reduction of potable water purchased from outside sources. This objective has been achieved ahead of schedule.

As a Net Zero Water Installation, our goal is to limit the consumption of freshwater resources and return water back to the same watershed so not to deplete groundwater and surface water resources in quantity or quality over the course of a year.

# ENERGY & WATER

## FY11 WATER CONSERVATION PROJECTS

- Installed waterless urinals, low flow fixtures, xeriscaping, and low maintenance indoor wash racks in new construction.
- Implemented landscape practices such as winter irrigation, deep aeration, and weather smart controllers.
- Removed several acres of water intensive turf grass and replaced with sustainable landscaping alternatives.
- Completed Comprehensive Energy and Water Master Plan.
- Performed demonstration of Coolerado\* units to evaluate electric cooling vs. water cooling.
- Installed pre-rinse nozzles at dining facilities.



*Reclaimed water is used to irrigate the golf course*

\* Fort Carson in no way implies federal endorsement of the organizations or companies mentioned in this report.

# ENERGY & WATER



*A Net Zero Water Installation limits the consumption of freshwater resources and returns water back to the same watershed so not to deplete the groundwater and surface water resources in quantity or quality over the course of a year.*

*Fort Carson's recent designation as a pilot Net Zero Installation accelerates the timeline for Fort Carson to achieve water goals to 2020 from 2027.*

## STRATEGIES TOWARD NET ZERO WATER

- Complete water balancing audit through Pacific Northwest National Laboratory.
- Expand non potable water system.
- Study the expansion of reclaimed water system.
- Investigate feasibility of storing treated wastewater in view of water rights law.
- Explore opportunities for beneficial use of stormwater and grey water.
- Participate in Water Returns Program training.
- Complete Net Zero Water action plans.
- Cease building wash racks in new construction in favor of Central Vehicle Wash Facility, which saves approximately 60 million gallons per year.
- Retrofit water fixtures with low or no-flow alternatives where cost effective.
- Make waterless urinals and other low-flow fixtures standard in new construction.
- Move towards more xeriscaping and less turf to reduce irrigation.
- Elevate awareness of Net Zero Water policies by daily briefings to incoming Soldiers.

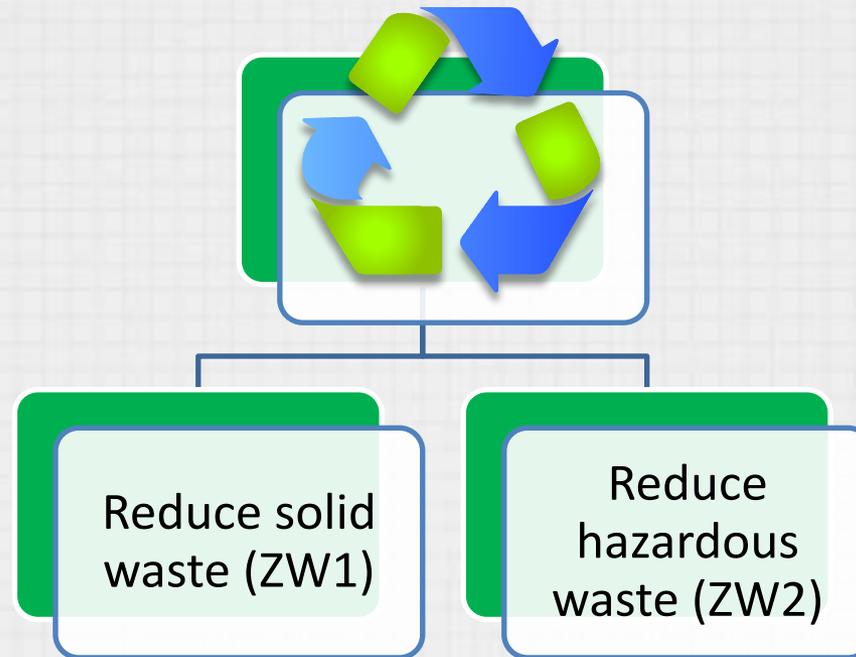
## CHALLENGES TO NET ZERO WATER

- Definition for Net Zero Water continues to be refined.
- State water laws limit opportunities.
- Balancing the desire for healthy turf in some areas with water consumption.

**“WATER WE CONSERVE OR ENERGY WE DON'T WASTE MEANS FEWER CONVOYS. FEWER CONVOYS MEAN FEWER CASUALTIES.”**

**Honorable Katherine Hammack** , Assistant Secretary of the Army for Installations, Energy and Environment

# ZERO WASTE



## OVERALL ASSESSMENT ■

**CHALLENGES** Population growth, Cycle of deployments & redeployments, Resource availability, Legal & other requirements, Communicating policies and Educating a shifting population

## OUTLOOK ■

**OPPORTUNITIES** Enhanced opportunities for innovative public private partnerships as a result of Net Zero designation

# ZERO WASTE



## OBJECTIVE

Reduce Solid Waste Disposal Through Sustainable Procurement Practices, Reduction In Material Use, Reuse And Recycling.

## PROGRESS

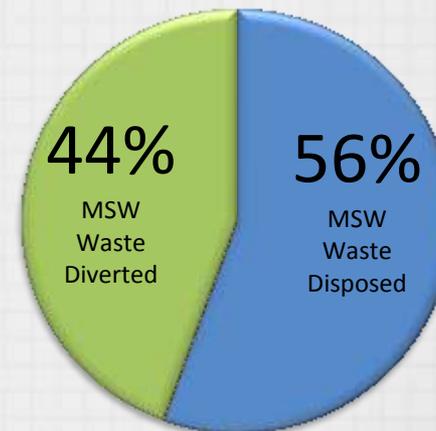
During FY11 15,986 tons of municipal solid waste (MSW) and 18,361 tons of construction and demolition (C&D) debris was generated on post for a total of 34,347 tons of waste. 23,951 tons was diverted from the landfill. The total diversion rate (including C&D) was 69.73%.

Of the 18,361 tons of construction debris generated, all but 1515 tons was diverted. Thus, approximately 91% of construction debris was diverted from the landfill.

Proceeds from the sale of recycled commodities was \$966,366; enough to fund recycling program costs and \$400,000 in environmental and recreation projects. It cost the installation approximately \$1.07 million to dispose of waste that was not repurposed or recycled, demonstrating the financial benefits of achieving the zero waste goal.

## FY11 MSW Diversion and Disposal Rates

(Municipal Solid Waste (MSW) does not include C&D (construction and demolition))



*During FY11, the municipal solid waste diversion rate was 44.45%. Of the 15,986 tons of municipal solid waste generated on post, not including housing which is privatized, 7,107 tons was diverted from the landfill by recycling or reuse and 8,879 tons was disposed of in a landfill.*

# ZERO WASTE

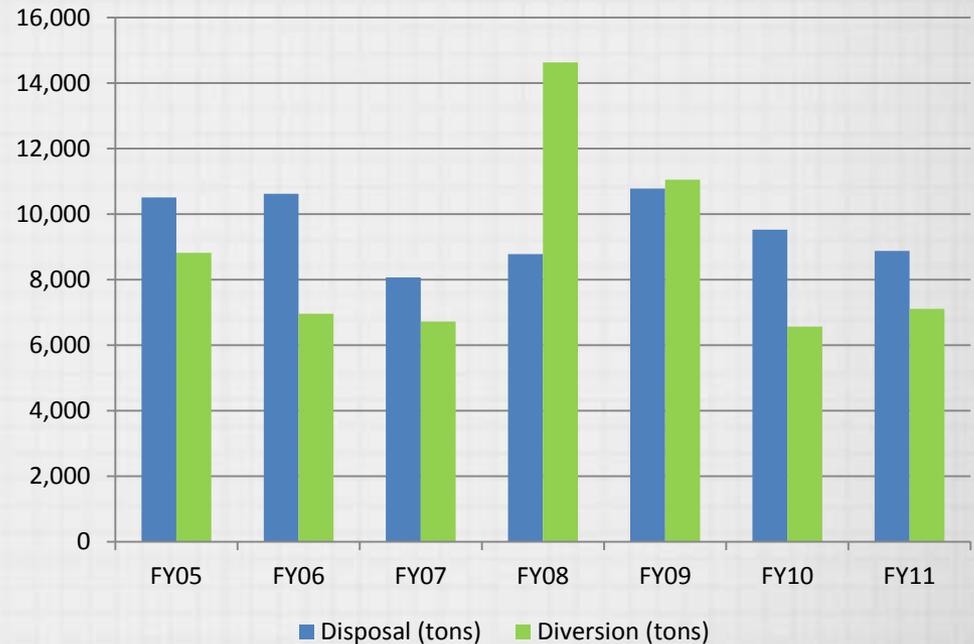
## Progress

The installation is on track to achieve the goal objective of 65% diversion rate by FY15, and its ultimate goal of Net Zero Waste by 2020.

Goal success demands that purchasers consider and reduce or eliminate waste that will be created when the useful life of a product or service is over (Sustainable Procurement) and effectively use, reuse, repurpose or recycle all materials.

Achieving the goal has many benefits such as cost avoidance, maintaining mission capability, elimination of the need for landfills, protection of human health, and optimization of the use of limited resources.

### Historical MSW Diversion and Disposal Rates



# ZERO WASTE

## Progress



*Soldiers and Civilians from the Army Field Support Battalion Fort Carson unload recyclables at the Recycle Center. The battalion collected 36,044 pounds of recyclables to claim first place for the third quarter of Fort Carson's Unit Recycle Incentive Program.*

The Unit Recycle Incentive Program reinforces a sustainable mindset across the Installation by providing rewards for units to prevent recyclable waste from going to the landfill. Points are assigned for the pounds of recyclable goods turned in and battalions can earn significant monetary rewards for their unit's morale, welfare and recreation funds.

In partnership with The First Sergeant's Barracks Program and BOSS (Better Opportunities for Single Soldiers), a barracks recycling pilot program was initiated to improve recycling rates through education and placement of recycle centers in convenient

central locations. Reaching the changing population in barracks is an ongoing communication challenge given the current state of Army transformation and the ARFORGEN (Army Force Generation) Cycle which affects units deploying and returning home.

The outcome of the pilot was that increased education and awareness of the connection between waste reduction, recycling and energy security, resulted in increased recycling rates in the pilot location. A roadmap for future implementation in barracks was created as a result of the pilot.

# ZERO WASTE



## FURNITURE DONATION = LANDFILL DIVERSION

A pilot furniture donation program, in partnership with Directorate of Public Works First Sergeant's Barracks Program and Recycling Division, was initiated with 5 tons of used barracks furniture diverted from the landfill and donated to local nonprofits.

## ELECTRONIC RECYCLING EVENTS

At a Make A Difference Day event at Iron Horse Park, volunteers assisted Sustainable Fort Carson in the collection of 500 lbs. of unwanted personal electronics, including computers, monitors, VCRs and stereo equipment.

These items were diverted from the landfill.

The Directorate of Family, Morale, Welfare & Recreation (DFMWR) hauled the container to El Paso County's Household Hazardous Waste facility for proper recycling.

# ZERO WASTE

## GREEN CHAPEL INITIATIVE



Fort Carson's Religious Support Office showed outstanding leadership and support of Net Zero goals through their "Green Chapel Initiative" with a stewardship theme.

Energy and water efficient appliances were installed in their facilities. Policies were adopted to support conservation such as discontinuing the use of disposable plates and glassware for chapel functions. This initiative served to educate and motivate chapel community members to make positive changes in their own homes.

## BALFOUR BEATTY COMMUNITIES



In support of Net Zero Waste, Balfour Beatty Communities upgraded recycling containers supplied to all housing residents to 96-gallon bins to enhance single stream service.

Recycling bins were issued to each home with the address inscribed on the bin. Participation in the housing recycling program increased from approximately 320 to 3200 households - a 900% increase!



# ZERO WASTE

## CREATING AWARENESS & CULTURE CHANGE



“Bag It”, an award winning documentary film about how plastic impacts our personal health and the planet, was screened more than 30 times to approximately 2,000 people. The film shows how a person can immediately make a difference to reduce plastic use and waste by being mindful of the choices made at the point of purchase.



The reTHINK campaign included a full day seminar for all stakeholders to develop installation-wide strategies and initiatives to achieve Net 0 Waste and Sustainable Procurement Goals



A favorite pastime for kids on post is “smashing boxes” - collapsing cardboard boxes in preparation for recycling.



Soldiers, like the ones pictured here from the 52nd Engineering Battalion, will also benefit from culture change to less bottled drinks and plastic bags. They will have less to pick up when on “area beautification” detail !

# ZERO WASTE



## OBJECTIVE

Waste Disposed Of Through The Hazardous Waste Storage Facility (HWSF) Is Reduced Through Sustainable Procurement Practices, Reduction In Material Use, Reuse And Recycling.

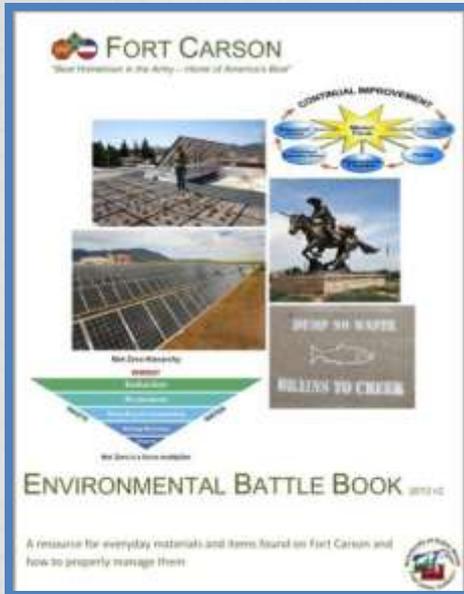
## PROGRESS



- \$15,300 was saved as a result of continued recycling of heptane.
- 16,672 lbs. of fluorescent lamps were crushed and recycled.
- 14,527 lbs. of batteries were recycled, of which 4,240 lbs. were rechargeable, resulting in a savings of \$8,480.
- 80% parts washer solvent waste was eliminated because of the purchase of two new solvent distillation units installed at the HWSF. This purchase also results in cost avoidance as it eliminates the need to purchase new solvent.

# ZERO WASTE

## PROGRESS

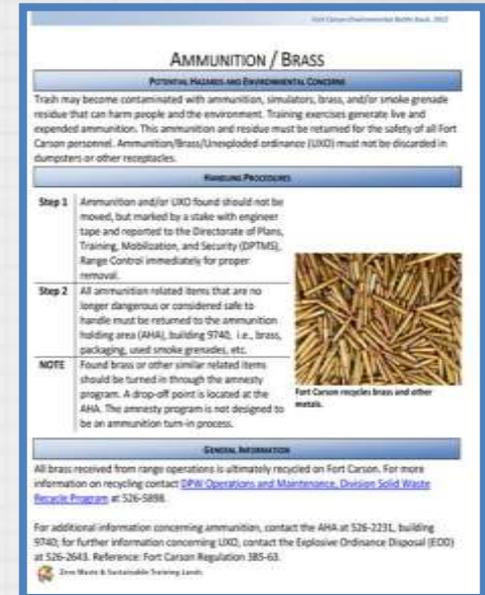


*The Battle Book is a resource for everyday materials and items found on Fort Carson and how to properly manage them.*

Since its introduction in FY10, The Fort Carson Environmental Battle Book has proven to be a widely used reference for personnel located throughout the installation. The online guide provides a quick reference for the most common environmental concerns units and other organizations on Fort Carson face daily. More than 60 “fact sheets” cover such topics as used oil, recycling, the management of material and handling procedures for aerosol cans, paint, batteries, tires and more.

The guide has been recognized as a useful tool to relate sometimes confusing topics about hazardous waste disposal to the layperson. The bottom of each fact sheet relates how proper disposal of the topic item relates to one or more of the sustainability goals.

The Environmental Battlebook is available at <http://www.carson.army.mil/DPW> or by calling 719-526-4340.



*The Battle Book was designed to be user friendly. Each topic, or Fact Sheet, is limited to one page to provide the most useful information.*

# ZERO WASTE



*A Net Zero Waste Installation reduces, reuses, and recovers waste streams, converting them to resource values with zero landfill over the course of a year.*

*Fort Carson's recent designation as a pilot Net Zero Installation accelerates the timeline for Fort Carson to achieve water goals to 2020 from 2027.*

## STRATEGIES TOWARD NET ZERO WASTE

- Continue program expansion through purchases of recycle collection containers and material processing equipment.
- Continue reduction of hazardous waste through paint thinner and parts washer distilling, heptane recycling and battery recycling.
- Continue Unit Recycle Incentive Program to encourage unit awareness and participation in reducing waste.
- Pilot Net Zero waste initiative in Building 1219 to maximize recycling to the highest extent. Strategies include use of composting bins, removal of personal trash cans and encouraging staff to consider what items they bring in.
- Follow Sustainable Procurement practices that require less packaging, ordering in bulk and recycled product content.
- Explore Single Stream Recycling opportunities.
- Elevate awareness of Net Zero program and policies by daily briefings to In-processing Soldiers.

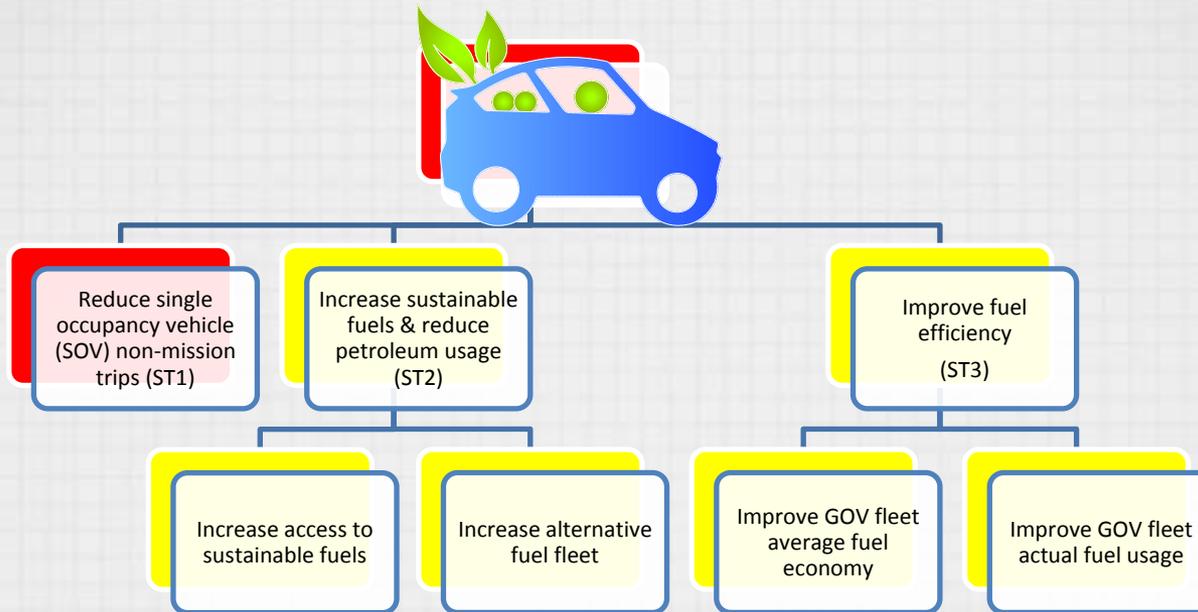
## CHALLENGES TO NET ZERO WASTE

- Motivating the population to participate in recycling programs.
- Markets for some items (electronics, Styrofoam, etc.) not readily available or cost effective.
- The results of "Waste to Energy" study demonstrated that the technology is feasible but not yet cost effective.

**"LISTEN UP, YOU COUCH POTATOES: EACH RECYCLED BEER CAN SAVES ENOUGH ELECTRICITY TO RUN A TELEVISION FOR 3 HOURS."**

**Denis Hayes** , founder of Earth Day

# SUSTAINABLE TRANSPORTATION



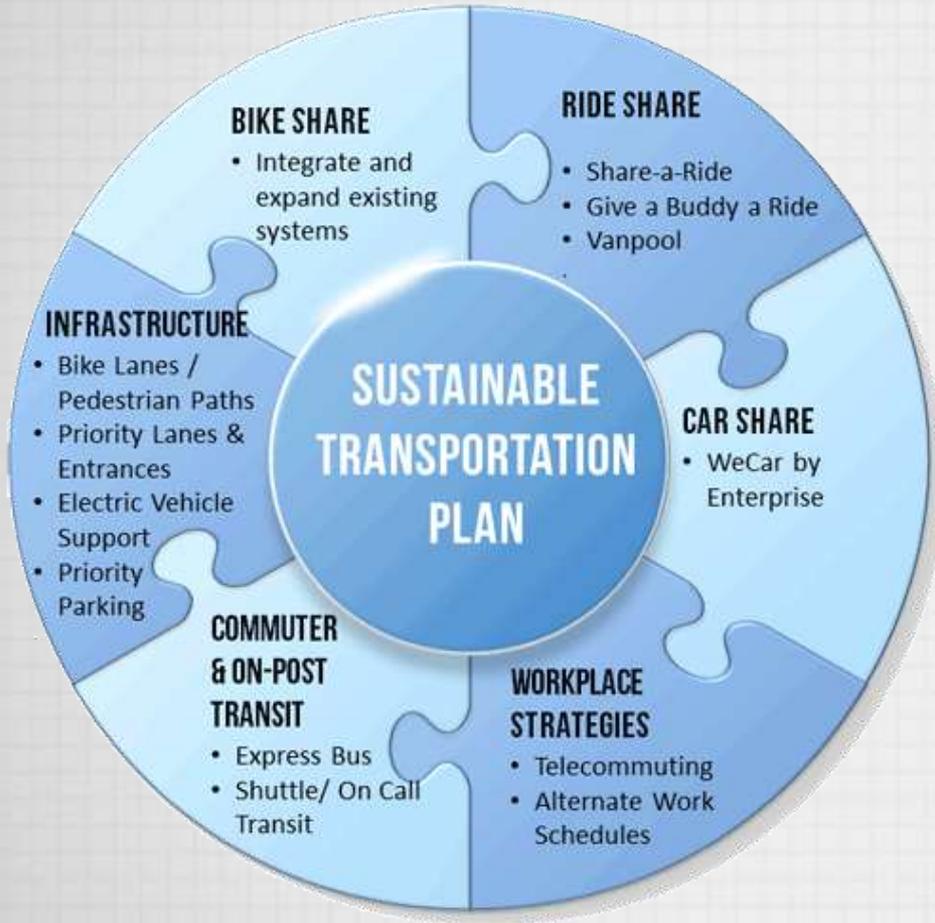
## OVERALL ASSESSMENT: ■

**CHALLENGES:** Population growth, Car culture, Lack of public transit, Resource availability, Legal & other requirements, Land use policy & planning (road expansion vs. alternatives), Communicating policies & Educating a shifting population, Fleet reduction, Alternative fuels, Alternative modes (shuttle, bikeshare, etc.)

## OUTLOOK: ■

**OPPORTUNITIES:** More alternative fuels usage and infrastructure, bikeshare and rideshare programs, increased pedestrian and bike lane connectivity.

# SUSTAINABLE TRANSPORTATION



## BENEFITS

- Provides low cost, easy to implement Single Occupancy Vehicle (SOV) alternatives.
- Provides transportation for “non-choice” transit riders.
- Decreases wait times at gate and traffic volume.
- Eliminates or reduces future gate and post roadway expansions / maintenance.
- Reduces air pollution.
- Mitigates parking demand.
- Saves maintenance and gas for personal vehicle.
- Decreases Soldier/employee stress.
- Promotes physical, spiritual and social fitness, health and wellness.



*The plan guides the transportation team while bringing various parts of the system online*

Mission

Environment

Community

Economy



# SUSTAINABLE TRANSPORTATION



## OBJECTIVE

Reduce (SOV) Single Occupancy Vehicles For Non Mission Trips.



## PROGRESS

Rideshare programs (car, van and bike) provide mobility options and low cost alternatives to Single Occupancy Vehicles.

During FY11 more parts of the Sustainable Transportation system came online. Formal bikeshare programs are in place at the Directorate of Public Works, United States Army Garrison Headquarters, Headquarters Company for in-processing Soldiers and the Colorado Inn.

Enterprise debuted its WeCar carsharing program at Fort Carson.

Demand for commuter express bus services in three major transit corridors to be provided by a local transit authority was assessed and found to be strong enough to support fixed route service. However, commencement of bus service is delayed indefinitely due to budget limitations. Potential transit commuters are actively forming car and vanpools instead.

Plans for a post shuttle for FY12 are underway.

Mission

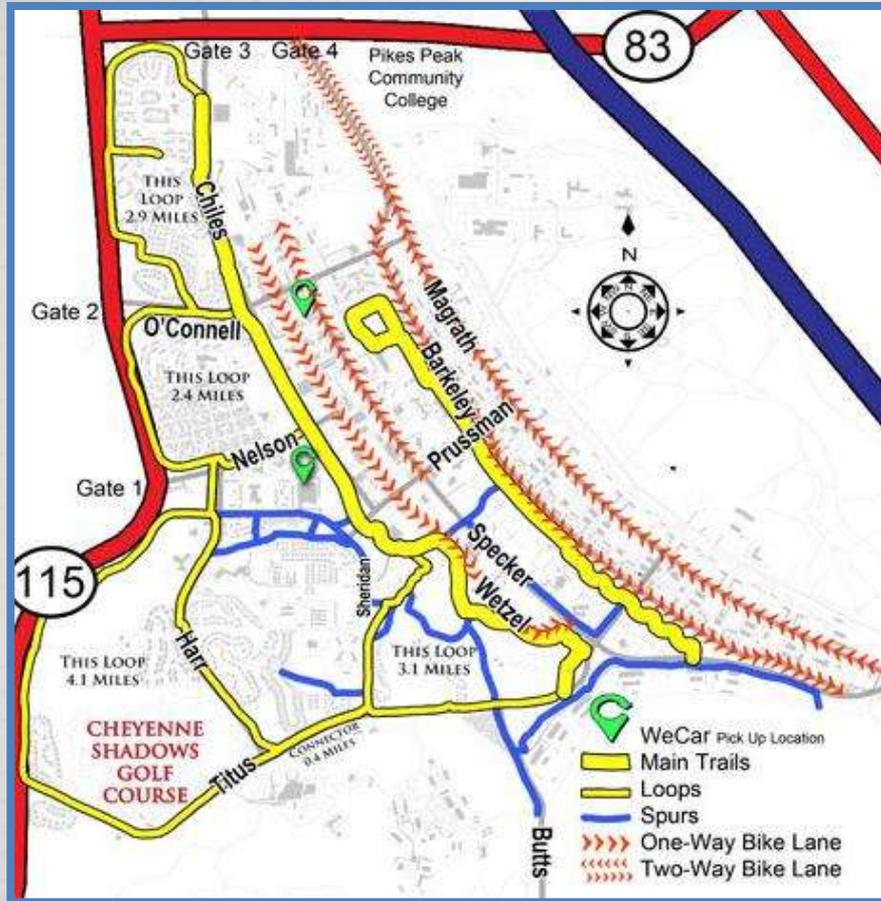
Environment

Community

Economy



# SUSTAINABLE TRANSPORTATION



## PROGRESS

Sustainable Fort Carson developed the installation's first comprehensive bike and running trail map, detailing more than 10 miles of new and expanded trails for on Post mobility. More than 20 miles of trails are available on Post for recreation and transportation

The map supports marketing efforts for the use of alternative transportation and also incorporates safety, health and well-being information.

*The new Running Trail & Bike map connects people and places on Fort Carson and encourages expansion of social networks and community.*

# SUSTAINABLE TRANSPORTATION



## OBJECTIVE

Increase Use Of Sustainable Fuels, Reduce Petroleum Usage And Improve Fuel Efficiency.

## PROGRESS



*The Smith\* Electric Vehicle Newton model, used for transporting recycled materials, has a top speed of 50 m.p.h. with a range of up to 100 miles on a single charge. The 80 kwh lithium-ion battery takes 6-8 hours to fully charge and has an expected life of 15 years. The vehicle can haul more than eight tons of cargo.*

A pilot project with the National Renewable Energy Laboratory, and TARDEC (Tank Automotive Research and Development Command) to develop a micro-grid in the cantonment area using distributed “smart-connected” vehicles resulted in the delivery of five zero emissions Smith electric trucks.

The trucks are used for commercial and personnel transportation and also act as dynamic bi-directional energy storage devices, with the capacity to provide and store power. Thus the vehicles provide a mobile unit for emergency power generation (replacing diesel), bridge between solar and wind energy sources and the grid, help shave peak energy demand costs, and are part of a growing “micro-grid” infrastructure.

These benefits are delivered at a cost savings over conventional vehicle / generator combination.

# SUSTAINABLE TRANSPORTATION

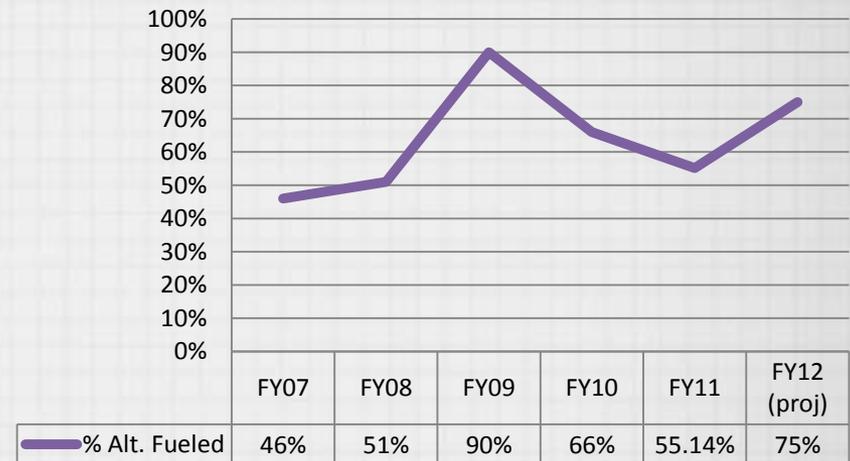
## PROGRESS

Fort Carson continued participating in General Services Administration (GSA) mandated program to steadily improve the fuel efficiency of the fleet. Four new public and three new private electric vehicle charging stations were added.

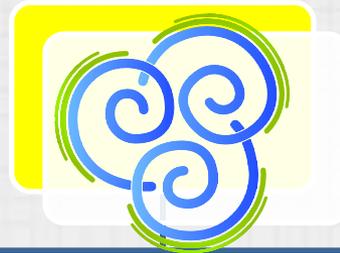
The Directorate of Logistics reports 322 alternative fuels vehicles in the existing fleet, including E85 (Flex Fuel), hybrid and electric vehicles (sedans, light-duty trucks, neighborhood electrics, and Smith Electric trucks).

To further ease traffic flow, an adaptive traffic control system is planned for FY12. This virtual system is similar to one recently adopted by the Colorado Department of Transportation for use in the City of Woodland Park. Sensors installed along primary roadways communicate to a central controller which analyzes current traffic conditions. The controller directs real time signal adjustments to optimize traffic flow, which may reduce or eliminate the need for costly roadway expansion.

**% New DoL GSA Fleet Alt. Fueled**



# AIR QUALITY



Reduce Scope 1  
GHG emissions  
(AQ1)

Reduce Scope 2  
GHG emissions  
(AQ2)

Reduce Scope 3  
GHG emissions  
(AQ3)

Reduce hazardous  
air pollutant  
emissions (AQ4)

Reduce Criteria  
Pollutant  
emissions (AQ5)

## OVERALL ASSESSMENT



**CHALLENGES** Population growth / vehicle emissions, Facility construction, Cycle of deployments and redeployments, Data collection & Resource availability, Legal & other requirements, Communicating policies & educating a shifting population, Dependency on success of energy & transportation reductions.

## OUTLOOK



**OPPORTUNITIES** Alternative fuels infrastructure in the region, Regional sustainability efforts

Mission

Environment

Community

Economy



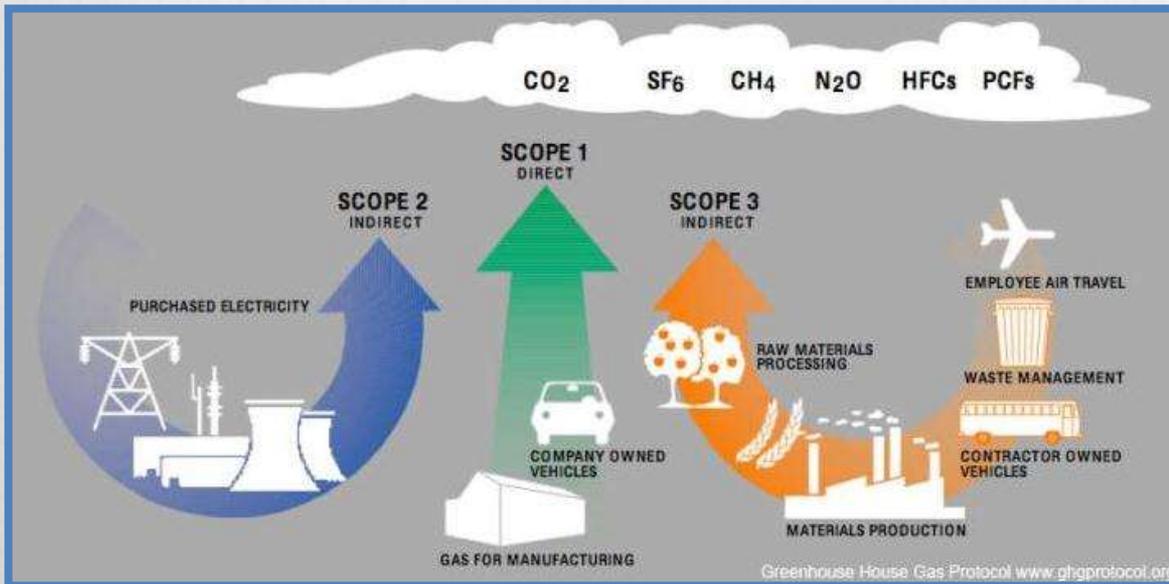
# AIR QUALITY



**GOAL** Reduce Installation Greenhouse Gases And Other Air Pollutants.

## PROGRESS

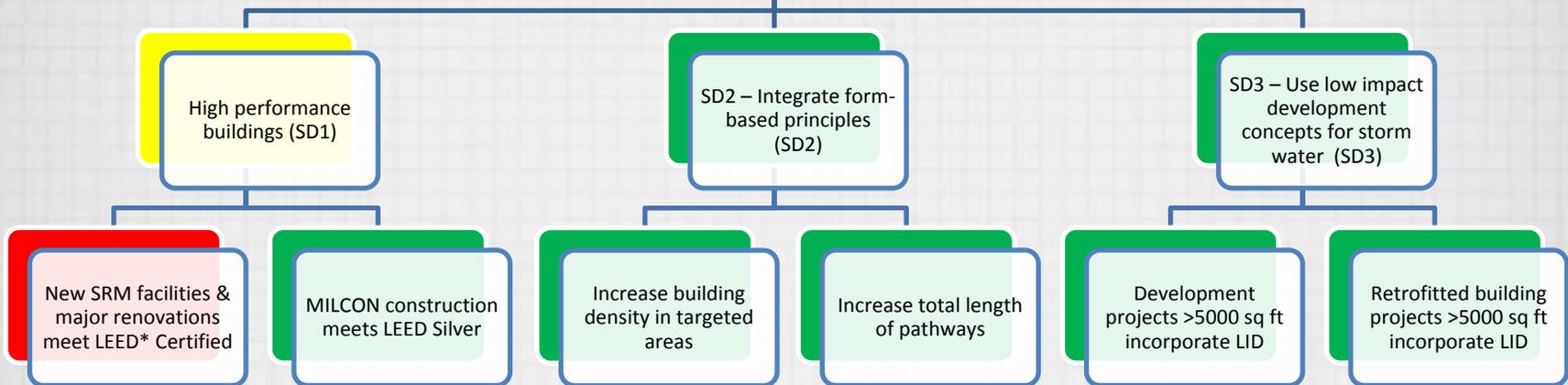
A 20% reduction of Scope 1 green house gas emissions (as compared to 2008 baseline) was achieved during FY10. During FY11, a hiring freeze and budget constraints impacted the ability to track data needed to benchmark successes relevant to the Air Quality goal.



This constraint had no impact on federally-mandated air quality compliance requirements. However, the Installation made progress on transportation, energy and other projects that directly impact air quality.

*GHGs (greenhouse gas emissions) are measured in tons of Carbon Dioxide Equivalents emitted.*

# SUSTAINABLE DEVELOPMENT



## OVERALL ASSESSMENT ■

**CHALLENGES** Population growth, Resource availability, Legal & other requirements, Communicating policies & Educating a shifting population.

## OUTLOOK ■

**OPPORTUNITIES** All newly constructed buildings must be LEED Silver or better, Use of LEED principles in renovation projects, LEED for Home in the housing community, “Net Zero Ready” standards exceed LEED.

*\*Leadership in Energy and Environmental Design*

Mission

Environment

Community

Economy



# SUSTAINABLE DEVELOPMENT

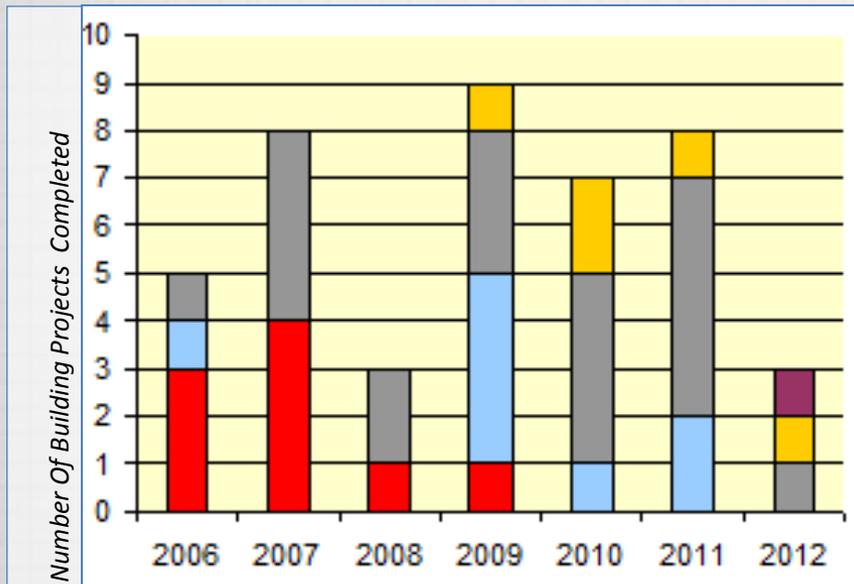


## OBJECTIVE

All New Facilities And Major Renovations Of Existing Buildings Will Be High-performance Buildings That Meet Or Surpass The Platinum Standard Of LEED By 2027.

## PROGRESS

LEED BUILDING CONSTRUCTION / RENOVATION



■ LEED Certified   
 ■ LEED Platinum   
 ■ LEED Silver  
■ No LEED rating   
 ■ LEED Gold

Fort Carson has one of the largest collections of federally funded U.S. Green Building Council LEED certified projects at a single location.

The Installation currently has 57 LEED buildings



24 LEED Silver



32 LEED Gold



1 LEED Platinum

At present there are 10 LEED certified professionals on staff.

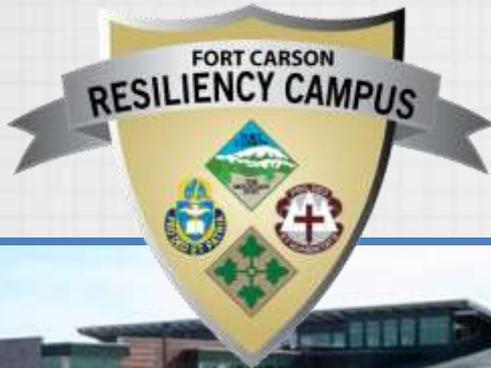


# SUSTAINABLE DEVELOPMENT



## OBJECTIVE

Integrate Form-based Code Principles Through Mixed-use Development Providing Pedestrian Friendly Connections, Building Density, And Carless Mobility.



*Iron Horse Fitness Center is a world class gym that is part of the new Fort Carson Resiliency Campus whose mission is to develop resiliency and self-reliance in Fort Carson Soldiers, Families, Retirees and Army Civilians.*

## PROGRESS

As part of the Installation's deepening commitment to a holistic approach to taking care of people, the Wellness Center is transitioning to the Forrest Resiliency Center.

The center is part of the Fort Carson Resiliency Campus, which will bring together many health, wellness and resiliency services under one roof and within walking distance.

Having a facility dedicated to mind, body and spiritual health is key to creating a strong, resilient community, both inside and outside the fence line.

Mission

Environment

Community

Economy



# SUSTAINABLE DEVELOPMENT

## PROGRESS

During FY11, Building 1219 was transformed from a 1950s barracks facility into a state of the art energy and water efficient building designed for the comfort, flexibility and well-being of the occupants.

This sustainable renovation project includes:

- Green Roof.
- Sun decks, daylight and flexible spaces.
- Bike access, bikeshare program.
- Solar hot water.
- 90% lighting energy improvement (motion sensors and daylight sensors).
- Two gas-fired condensing boilers that produce hot water pumped through a mile-long network of pipes to heat the building. Most of the "waste energy" generated by the boilers is captured and fed back into the system, bumping the efficiency of the boilers up to 97% over traditional boilers, which are approximately 80% efficient.
- Cooling for the building is provided by chilled water flowing through a separate insulated pipe system that requires about 25% less energy compared to cooling in similar size buildings.



*Directorate of Public Works and U.S. Army Corps of Engineers staff are the new occupants of the centrally located sustainably-renovated building. Employees now park their car for the day, and walk or bike to nearby garrison locations for meetings, lunch and gym. Shown here is the "green roof" featuring native grasses and plants.*

This repurposing and renovation project was completed at a cost of approximately \$5.1 million. Constructing a new building to the same specification is estimated to be about \$20 million.

Many features of 1219's renovation are being tested for replication for future projects.

LEED-EB (Existing Building) certification is pending.

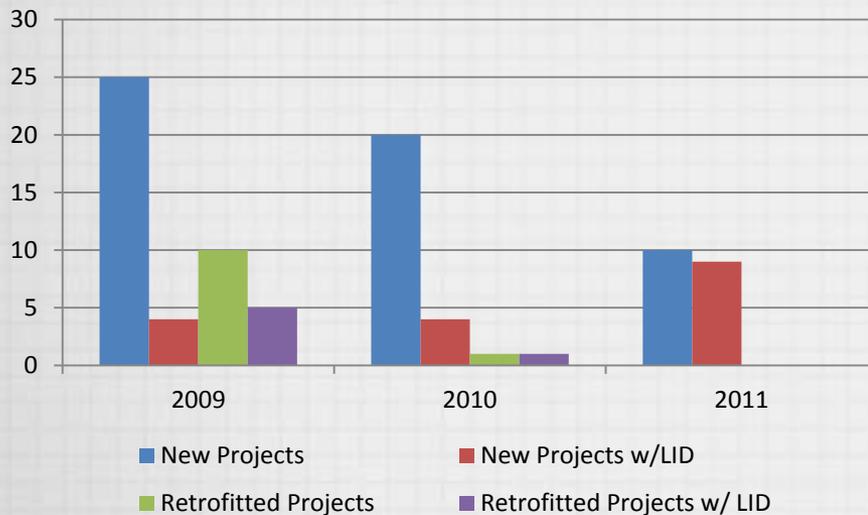
# SUSTAINABLE DEVELOPMENT



## OBJECTIVE

Use LID (Low Impact Development) Concepts And Other Methods To Mitigate Stormwater Impacts Through Best Practices.

PERCENTAGE OF LIDS INSTALLED IN NEW AND RETROFITTED BUILDING PROJECTS



In FY11, 90% of new development projects incorporated LID technology, exceeding the FY12 target of 75%.

Traditional Stormwater Management	Low Impact Development
Peak Reduction (flood reduction)	Volume Reduction (pollutant reduction)
Pave, Pipe & Pump	Slow, Spread and Soak
Central Treatment	Multiple Controls
Site Design	Watershed Integration Design

During FY11, the Stormwater program provided approximately 50 model calculations for new construction projects to determine the differences of runoff amounts between natural conditions and proposed impermeable surfaces. This modeling determines the volume of water to be handled through LID.

# SUSTAINABLE DEVELOPMENT



## OBJECTIVE

Use LID Concepts And Other Methods To Mitigate Stormwater Impacts Through Best Practices.

## PROGRESS

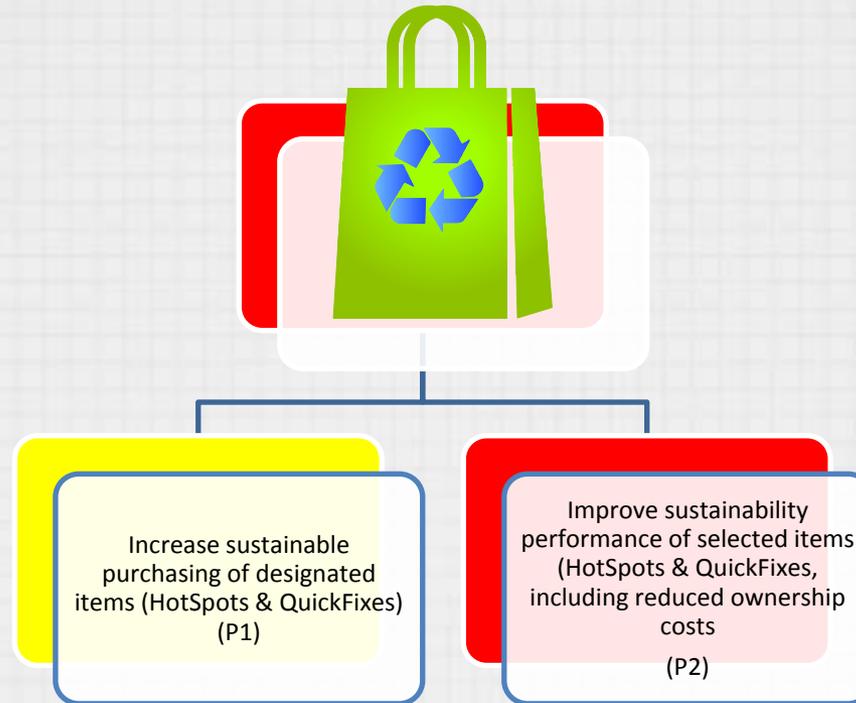


A rain garden (also known as grass swale or bio-swale) uses a precious resource – rainwater. Xeric plants around the drain, curbs and curb cuts slow down, spread and soak in storm water. These landscaped islands are placed in parking lots to mitigate runoff.

This sustainable parking lot feature helps reduce the heat island effect and adds to the beauty of the area.

Stormwater education is provided on a regular basis to contractors, and on an as needed or requested basis to partners and stakeholders. Volunteers help clear drains and ditches several times a year. Two large dumpsters were filled with litter at a recent “Make a Difference Day “ event.

# SUSTAINABLE PROCUREMENT



## OVERALL ASSESSMENT ■

**CHALLENGES** Data collection, Resource availability, Cost competitive sustainable products, Cost accounting, Dispersed purchasing systems, Legal & other requirements, Communicating policies & Educating a shifting population

## OUTLOOK ■

**OPPORTUNITIES** Enhanced environmentally friendly and sustainable procurement education for purchasers; More sustainable alternatives through mandated sources.

Mission

Environment

Community

Economy



# SUSTAINABLE PROCUREMENT



## OBJECTIVE

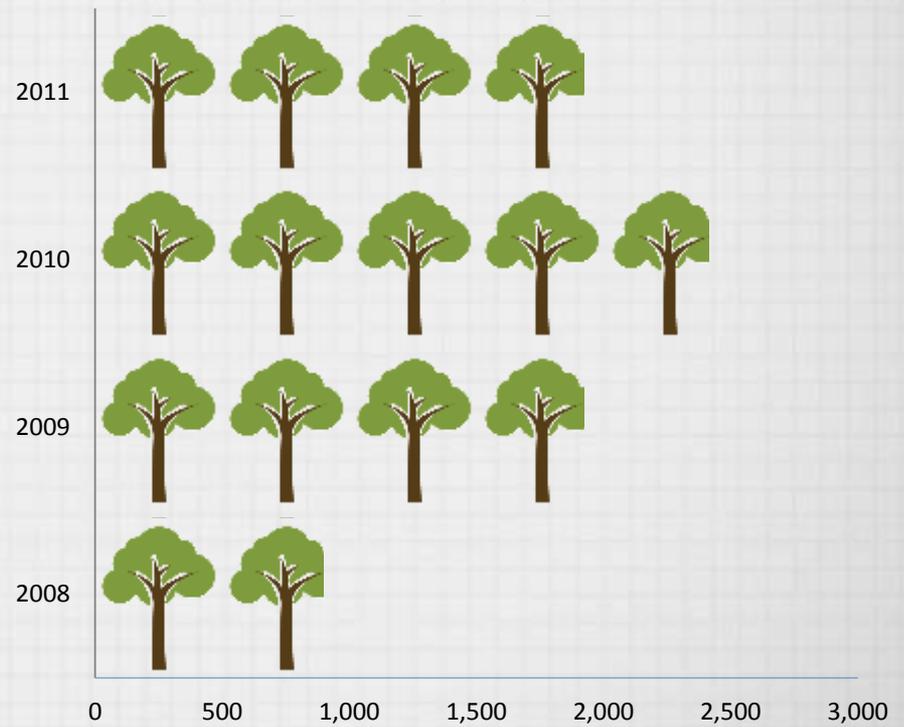
Increase Sustainable Purchasing Of Designated Items.

## PROGRESS

Purchasing environmentally friendly, or “green,” products and services is the best way to plan for the proper disposal of products when their useful life is done sometime in the future.

A 2009 paper policy which mandated recycled content has been successful and instrumental in saving thousands of trees. Awareness of the policy and the use of digital communications have helped reduce overall consumption from 9,807 cartons to 8,191 cartons from Envision, the Installation’s office supplier.

### TREES SAVED THROUGH USE OF RECYCLED CONTENT PAPER



# SUSTAINABLE PROCUREMENT



## OBJECTIVE

Improve Sustainable Procurement Levels As Identified By Hotspot And Quickfix Progress Towards More Sustainable Procurement Performance.

When purchasing an item, consider its eventual disposal. Is it reusable or recyclable?

reTHiNK

*Raising awareness of the impact of decisions in day-to-day operations to choose environmentally and energy conscious goods and services was the thrust of the "reTHiNK" campaign.*

## PROGRESS

The Sustainable Procurement goal plan is under revision to focus efforts of government purchase card holders, address educational needs and sustainability language in new contracts, and directorate-level involvement in compliance. The plan is based on requirements contained in Executive Order 13514 and Department of Defense Strategic Sustainability Performance Plan. Objectives for FY12 include achieving more Sustainable Procurement in the following areas:

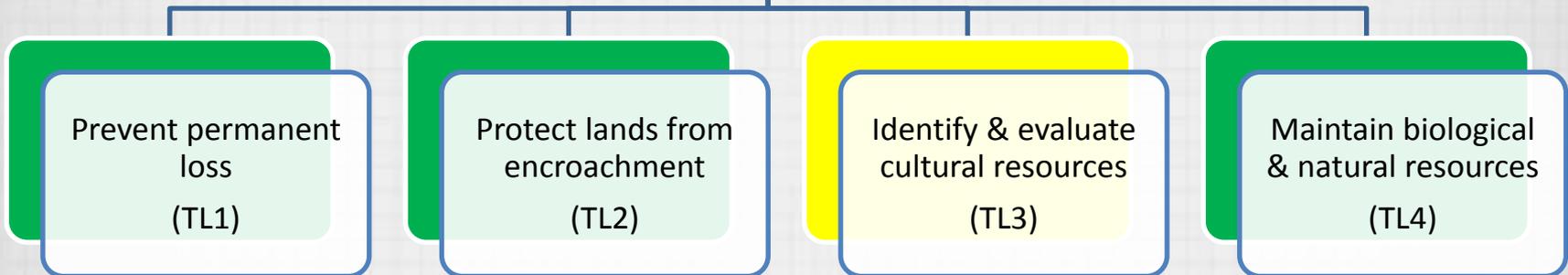
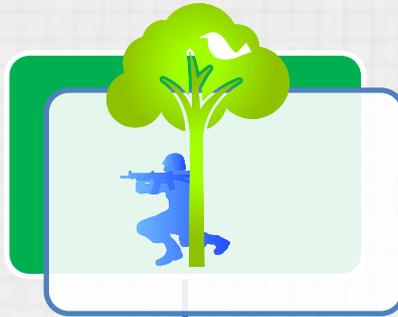
### HotSpots

- Batteries
- Lighting Systems
- Cleaning Systems
- Mattresses
- Refrigeration Devices
- Laundry Systems
- Vehicle Fuels

### QuickFixes

- Computers and computer peripherals
- Food service disposables
- Kitchen water devices
- Lavatory disposables
- Paint / sealants
- Printing services
- Printing paper

# SUSTAINABLE TRAINING LANDS



## OVERALL ASSESSMENT



**CHALLENGES** Cycle of deployments & redeployments, Intensity of use, Resource availability, Climate & weather, Encroachment, Ongoing public concerns, Communicating Policies & Educating a shifting population

## OUTLOOK



**OPPORTUNITIES** Proactive, transparent stewardship resource approach involving other federal & state agencies & concerned citizens, Partnerships & collaboration with public, non-governmental & private landowners & organizations, Landscape / ecosystem management approaches.

Mission

Environment

Community

Economy



# SUSTAINABLE TRAINING LANDS



## OBJECTIVES

Prevent The Permanent Loss Of Any Training Resource Due To Internal Encroachment, Biological, Natural Resource Or Other Issue; And Maintain Biological And Natural Resources In Sustainable Condition To Support Military Training.

## PROGRESS

Sustaining Army training lands requires a multifaceted approach including scientific stewardship and management of land resources, providing proper equipment for Soldiers, protecting cultural resources and assessing impacts to wildlife. A variety of operational and stewardship policies, programs and procedures are in place to ensure that Fort Carson's training lands are up to standard for the Soldiers of today and tomorrow.

Protection of natural and cultural resources is ongoing and includes land management practices such as resting and rotating lands similar to crop rotation, protecting wetlands and other sensitive habitats.

According to a FY10 assessment, of the total 339,000 acres of training lands, 306,000 is available for training -representing a 10% permanent loss. No significant change in the availability of training lands is noted for FY11.

## FY11 PROJECTS

- Purchased a Compressed Soil Block machine to construct temporary training buildings from dirt instead of utilizing permanent construction.
- Executed the Integrated Training Area Management (ITAM) Program to educate the land users on maneuver damage control, environmental stewardship and awareness.
- Mapped maneuver trails and gullies; increased mounted maneuverability in specific areas of Fort Carson Military Reservation and Pinon Canyon Maneuver Site; updated Troop maps and revised regulations.
- Constructed erosion control dams, reseeded maneuver training lands and increased safety and traffic ability throughout the training areas.
- Conducted monitoring, evaluation, trend analysis and project planning in coordination with environmental division to increase the available maneuver acreage by over 21,000 acres.

Initiatives for FY12 include working with engineers to prevent permanent loss from internal development, and permanent damage from training or natural causes.

# SUSTAINABLE TRAINING LANDS



## OBJECTIVE

Protect Fort Carson Ranges And Training Lands From External Encroachment By Creating A Contiguous 1½ To 2-mile Wide Proposed Buffer Around A Significant Portion Of The Installation's Southern And Eastern Perimeter.

## Progress



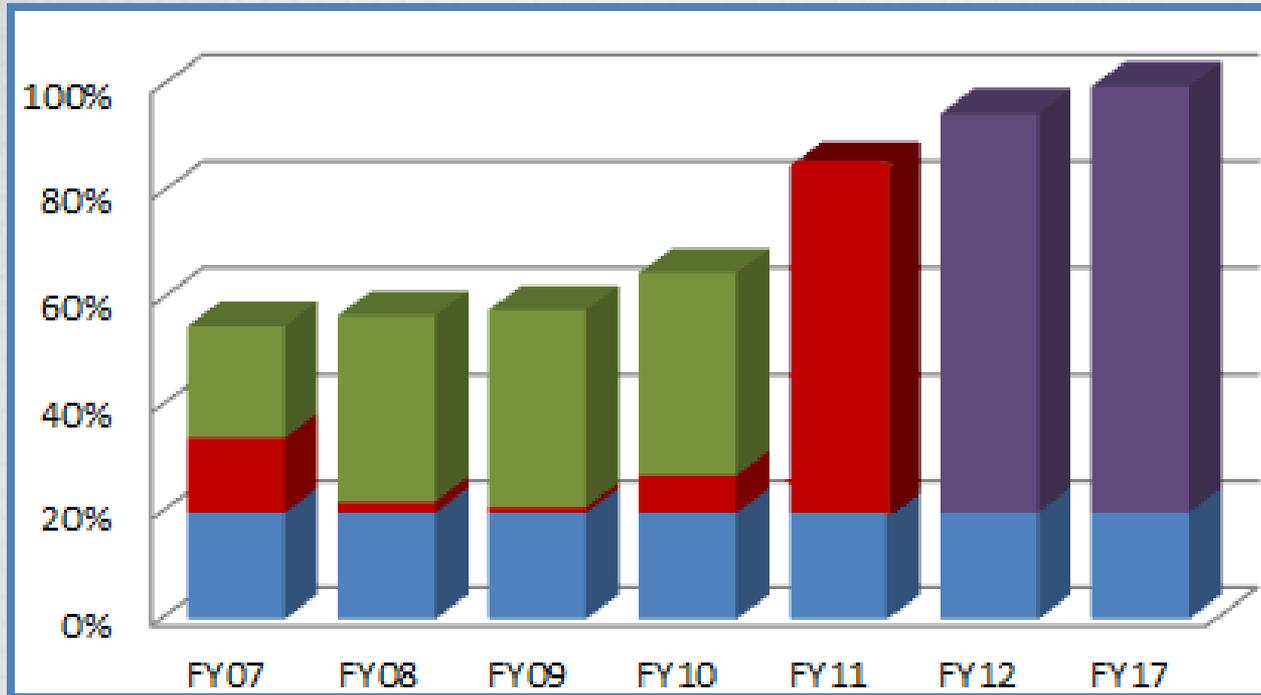
*Conservation easements allow Fort Carson to permanently maintain a 1½ to 2-mile wide external buffer zone separating training ranges and communities adjacent to the southern end of the post. The buffer will ensure that the post can protect and sustain current and future training capabilities on range areas*

Under the Army's Compatible Use Buffer (ACUB) Program , conservation easements on 7,045 acres of land bordering the Installation's southern and southeastern boundaries were finalized in FY11. This acquisition completed a nine-year process to secure easements on a total of 22,292 acres of land with the Walker family and our partner The Nature Conservancy. The goal of protecting Ranges 123 (Air Burst), 143 (Digital Multipurpose), 145 (Tank Table 7) and 147 (Tank Table 6) has been achieved.

The FY12 target of 75% of the proposed buffer area was attained and exceeded in FY11. A total of 23,300 acres of land within the approved buffer have a permanent conservation easement or have been acquired by ACUB partners.

In view of ahead of schedule goal achievement, the primary focus has shifted to the protection of the Large Impact Area, working with ACUB partner El Paso County. The goal plan is currently being evaluated to redefine objectives and work plans.

# SUSTAINABLE TRAINING LANDS



*Conservation easements limit development, protect natural resources and buffer military training areas.*

*Conservation easements also allow landowners to maintain their interest in the property as well as use the land for traditional purposes.*

- Conservation Leases / Purchase Options
- Target Goals according to the goal plan in force as of this writing
- Land Permanently protected through Fort Carson action
- Land area with Pre-Existing Compatible Land Use

# SUSTAINABLE TRAINING LANDS



## OBJECTIVE

Meet Or Surpass Environmental Management Goals By Identifying And Evaluating Cultural Resources On Training Lands In Support Of Current And Future Training.

## PROGRESS

It is the responsibility of every Federal agency to establish a preservation program to protect and preserve historic properties which it owns or controls. Fort Carson has a vast amount of historic properties to manage and protect. Over the years Fort Carson has identified in excess of 5,460 archeological sites, of which approximately 15% are designated historic properties and require protection.

Fort Carson has surveyed 86% or 306,310 acres of the lands it ever expects to inventory (duded impact areas will not be surveyed due to safety concerns).

Fort Carson has been working closely with the Colorado State Historic Preservation Officer (SHPO) and others to develop a Programmatic Agreement (PA) as an alternate Section 106 process to individual undertaking reviews. The PA will streamline review of training activities and reduce required planning timelines.

## FY11 PROJECTS

- Lockwood Canyon Survey on 900 acres at the Pinon Canyon Maneuver Site (PCMS) was funded and inventory started.
- Old Training Area (TA) C , PCMS (5,200 acres) was funded and inventory started.
- TA 10 surveys (4,000 acres) – a variety of previously unsurveyed areas within the main maneuver area at PCMS was inventoried, site forms are not yet completed.
- Developed a site protection and marking strategy for the main mechanized training areas at PCMS (93K acres).
- Performed reevaluations on 186 archeological sites at PCMS to support the future site protection strategy.
- Awarded a contract to Siebert mark most archeological sites within the main mechanized maneuver area at PCMS.
- Began work at Fort Carson to validate the location and reevaluate sites for future development of a site protection and marking strategy.

Initiatives for FY12 include completing the update of the Integrated Cultural Resources Management Plan (ICRMP) and the development of a tactical digital overlay for archeological site protection during primarily off-road maneuvers.

# SUSTAINABLE COMMUNITIES



Evans Army Community Hospital (EACH), a general medical and surgical hospital on Fort Carson began its sustainability journey in April 2011 with a vision "to be the Army's Model Healthcare Organization for Sustainability." In a cost effective manner, EACH is integrating sustainable development, design and business practices as it maintains a safe, efficient and effective healing environment for patients and staff. As a direct result of its comprehensive sustainability program, EACH has already saved more than \$500,000 in FY12.

Mission

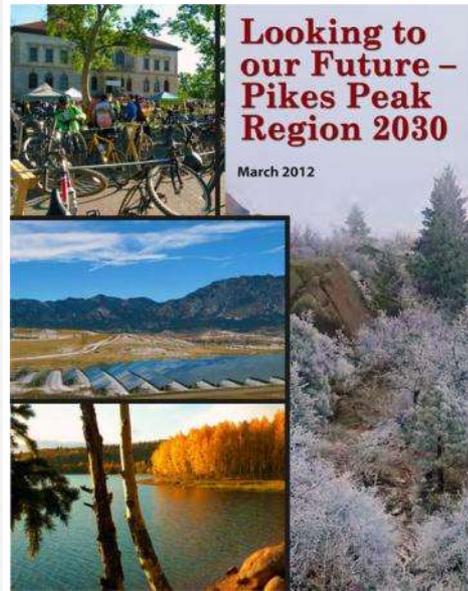
Environment

Community

Economy



# SUSTAINABLE COMMUNITIES



The [Pikes Peak Region 2030 \(PPR2030\)](#) provides a framework (not a mandate) by which local governments, institutions, businesses, and individuals can work together to find regional solutions to regional challenges.

Seeking to compliment the efforts of Fort Carson on a regional scale, regional stakeholders and local governments participated in a cooperative effort begun in August 2010 which resulted in [PPR2030](#).

Volunteers, professionals, and community leaders from nearly 100 organizations donated thousands of hours to create a long-term sustainability strategy for El Paso and Teller counties.

The plan focuses on “stretch goals” and the high-level strategies needed to achieve those goals. Stretch goals push participants to move beyond current efforts in the pursuit of new ideas, approaches and strategies.

The plan is broken into the following sections, each having its own narrative, goal statements and strategies:

- Agriculture
- Arts and Culture
- Built and Natural Environment (including air quality and water quality)
- Economic Development
- Education
- Energy
- Health
- Materials Management and Procurement
- Transportation

PPR2030 is key for the success of Fort Carson's sustainability and Net Zero goals.

# SUSTAINABILITY AWARDS 2011



*Acting Command Sergeant Major John S. Johnson (left) and Deputy Garrison Commanders Colonel John D. Keenan present the Sustainable Progress through Partnerships Award to Frank Kinder.*

*Frank Kinder is an alumnus of Sustainable Fort Carson (SFC), and currently works at Colorado Springs Utilities focusing on Commercial Water Conservation Rebates and Programs, promoting water conservation and sustainability in the Pikes Peak Region. Frank was instrumental in the certification of the Colorado's first EPA WaterSense \* Certified Home which also achieved USGBC's LEED for Homes Gold and EnergyStar\* certifications.*

Each year Fort Carson Presents Sustainability Awards at the annual Colorado Sustainability Conference to recognize the individuals and organizations on post and in the community who are catalysts for change and contribute toward our sustainability goals.

Installation staff and local community members received sustainability awards from Fort Carson at the Colorado Sustainability Conference held in Colorado Springs. Eleven awards in five categories were presented.

The Sustainable Progress through Partnerships award was presented to John Olson and Bob Mooney and Frank Kinder (see photo and sidebar). SFC team member, landscape architect and urban designer John Olson is a strong proponent for smart growth and holistic sustainability on post and in the community. Together with Bob Mooney, project director at Balfour Beatty Communities (BBC), a 65% decrease in the water needs for future homes was achieved through landscape changes designed by John. Bob Mooney received the award for that successful

collaborative effort in water conservation, as well as increasing residential recycling from 5 tons per month to 21 tons per month, and diverting thousands of tons of appliances, concrete, asphalt and carpet padding from the landfill. These efforts support sustainability and Triple Net 0 goals.

Ann and Eric Fetsch won the Sustainability Champions award for their service to Catamount Institute, U.S. Green Building Council's Leadership in Energy and Environmental Design and for their mentorship and advocacy efforts in the Pikes Peak region. Recent success include planning and implementing the certification of the first LEED show home in Colorado and a Sustainability Bike tour of Colorado Springs that showcased the city's many sustainable features.

# SUSTAINABILITY AWARDS 2011



*City of Colorado Springs employee and award winner Nick Kittle (center) was instrumental in reducing emissions in the Pikes Peak region by more than 5 million pounds of carbon dioxide, saving hundreds of thousands of taxpayer dollars through a combination of initiatives.*

Col. Jonathan Gibbs and U.S. Army Garrison Fort Carson Religious Support Office received the Sustainability Champions award for educating chapel communities about ridesharing, recycling, reducing electricity and water consumption through their "Green Chapel Initiative".

Donald P. (Phil) Chase, Peterson Air Force Base (PAFB), won the Excellence in Sustainable Resources award for achieving 80 % waste diversion rate and for efforts in recycling scrap metal that earned PAFB more than \$1 million for their Qualified Recycling Program.

Greg Willis and the team at Fort Carson's Cheyenne Shadows Golf Club won the Sustainable Resources award for saving more than 20 million gallons of water each year through conservation efforts. The team continues to show their dedication to preserving natural resources by re-using asphalt from old paths, composting grass clippings and recycling.

Jessica Frank, Fort Carson's Directorate of Public Works stormwater program manager, won the Achievement in Sustainable Development award for her work with the U.S. Army Corps of Engineers by improving stormwater drainage designs that will benefit the installation for years to come.

City of Colorado Springs employees Carrie McCausland and Nick Kittle (see photo and sidebar) each won the Superior Sustainability Leader award. McCausland's passion for recycling led to the successful implementation of recycling bins in downtown Colorado Springs.

Capt. Daniel J. Kull, commander of Headquarters and Headquarters Company USAG Fort Carson, won the Superior Sustainability Leader award for educating approximately 9,000 in-processing Soldiers each year about recycling and energy conservation. He also established a free bike share program that provides mobility and cost savings to Soldiers while reducing greenhouse gas emissions on post.



Fort Carson embraces sustainability as a partnership between our present and our future. We are committed to accomplishing all of today's missions in a way that will allow our successors to

accomplish all of tomorrow's missions. In doing so, we pledge to constantly improve the ways we care for, save, replenish and find new and better uses for all of the resources entrusted to us.



# SUSTAINABLE FORT CARSON



For more information about Sustainable Fort Carson or the contents of this report call (719) 526-9777 or go to [www.carson.army.mil](http://www.carson.army.mil)



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