Goal 1:
Sustainable Energy and Water Use
Five-Year Plan

Sustainable Energy and Water Use

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

The long term goal for this Five-Year Plan is to sustain all facility and mobility systems from renewable sources by 2027 and reduce the total water purchased from outside sources by 75% from the 2001 baseline by 2027. The desired end states are; secure sustainable energy sources; alleviation of dependence on fossil fuels and adverse air emissions; funding for life cycle costs; reduction of reliance on petroleum imports and vulnerability; reduction of wastewater discharges; efficient water consumption; increase in the quantity of re-use and; development of sustainable water source solutions.

Background

This goal is the result of the combination of two goals and a portion of another goal from the Sep 2002 sustainability conference. The original goals were:

Sustain all facility and mobility systems from renewable sources with the capacity to generate all facility energy on post.

Total water purchased from outside sources will be reduced by 75% from the 2001 baseline.

Reduce the total volume of wastewater and storm water treated by 75%.

The intent of these goals is to:

- Efficiently utilize energy, mobility, and water resources.
- Reduce reliance on fossil fuels - especially petroleum imports.
- Reduce impact on the environment from fossil fuels.
- Reduce vulnerabilities and volatility of energy and water sources.
- Obtain reliable low cost utility, mobility, and water services.
- Not automatically turn to distributed energy sources.
- Not burden existing energy and water systems.
- Enhance well being.
- Achieve closer alignment with The Natural Step system conditions.

This goal is the result of the combination of two goals in addition to the transfer of the wastewater and storm water treatment goal from the Zero Waste Goal. The primary method to

reduce the volume of treated wastewater is to reduce the volume of water used at the Installation. Thus, the wastewater treatment goal is a measure of the reduction of water purchased from outside sources. The treatment of storm water is an objective of this goal, which addresses energy and water.

The three objectives that make up this goal support sustainable utilities use. Reducing water used will reduce the amount that is treated by the sewage treatment plant. In fact, the only way to truly reduce the amount of water treated on the Installation is to reduce the amount used by the Installation. Reducing energy and water use will allow the Installation to continue its training mission even if the cost of fuel, energy, and water increase dramatically over the next 25 years or if current common sources of energy become scarce. In addition to saving money, reducing reliance on non-renewable and polluting sources of energy also improves the quality of air in which soldiers live and train.

Achievement of this goal supports Installation and force security. Distributed sources of energy are one way to enhance Installation security. With sources or backup sources of energy readily available and unlimited on Fort Carson, any problems with the centralized source will not affect training and readiness. Furthermore, if tactical vehicles have an available source of fuel that lasts longer than current fossil fuels, the vehicles will be able to go further without refueling, easing the logistics burden, as well as enhancing the vehicle's ability to safely return soldiers.

The Natural Step System Conditions

1. Nature is not subject to systematically increasing concentrations of substances extracted from the earth's crust.
2. Nature is not subject to systematically increasing concentrations of substances produced by society.
3. Nature is not subject to increasing degradation by physical means.
4. Human needs are met worldwide.

The objectives of this goal strongly and directly support the Natural Step (TNS) System Conditions. Decreasing concentrations of fossil fuels extracted from the Earth's crust supports System Condition 1. Renewable sources of energy typically do not pollute, thus System Condition 2 is supported by putting a lower concentration of man-made substances into the atmosphere. System Condition 3 is supported by the water reduction goals, because the less water taken from river systems, the lower the chances for degradation of that natural system. Finally, System Condition 4 is supported through a reduction in Fort Carson's minimized use of natural resources (i.e. water, fuel); thereby leaving more for other human needs.

Challenges and Barriers

- Resource Constraints
- Technological Barriers
- Economics
- Utility System Limitations
- Supply Systems
- Doctrine
- Contractor Dynamics

Strategies

- Policy Changes
- Monitoring
- Assessments and Implementation of New Programs
- Enhance Infrastructure to Support Goals
- Research Support
- Conservation Equipment
- Changes in Practices

Areas of Overlap

- Sustainable Transportation
- Platinum Buildings
- Zero Waste Efforts
- Sustainable Master Planning

Objectives, Initiatives, Steps and Resources

Objective 1.1: Increase percentage of facility and mobility systems using renewables to 10% by 2007, and reduce reliance on nonrenewable energy by (through conservation, education and other methods) 3% per year each year for the next five years.

Renewable sources of energy include solar, hydrogen, geothermal and wind energy. While not all are feasible or cost competitive yet, these sources are heavily researched and bear close monitoring for use at Fort Carson. This Objective addresses what Fort Carson can do to reduce non-renewable energy use over the next five years with an eye on emerging technologies, while using conservation as a primary component of the reduction strategy.

Initiative 1.1.1: Develop a plan to assess, list, prioritize, and program renewable energy options.
Lead: Directorate of Public Works (DPW)
Action Agent: DPW

Steps	Resources Needed	Time/Cost
Establish renewable energy baseline to gauge progress in future years		
Purchase 1100 blocks of wind source power (1320 MWH, 1%)		
Purchase allocated hydro power from the Western Area Power Administration (WAPA) (5800 MWH/YR, 4.5%)		
Stay involved and informed with Colorado Springs Utilities (CSU) renewable energy plans (2-5%)		
Meet with Platinum Buildings team to establish renewable energy applications in new facilities. Plan renewable demonstration technology projects		
Assess the current renewable energy practices and identify additional opportunities		
Meet with agencies promoting renewable energy applications and bring forward proposals to Installation leadership		
Annually increase budget available to purchase renewable energy for Fort Carson		

Measure: Plan in place for increasing renewable energy use at Fort Carson.

Initiative 1.1.2: Improve energy efficiency by using better monitoring and control systems.

Lead – DPW

Action Agent: DPW

Based on guidelines established by the Department of Defense (DOD), Fort Carson must reduce its energy use by nearly 35% of 1985 use. Fort Carson is not quite on schedule to meet that amount of reduction; thus further measures will need to be taken to ensure an even more aggressive schedule is met. If the energy reduction "glidepath" is projected to 2025, a 60% reduction in fossil energy use is required. Very aggressive measures will need to be taken to meet a 75% reduction from the 2001 baseline by 2025.

Energy monitoring will allow the establishment of responsibility for energy use. Reporting energy use, based on activity, household or building will allow pinpointing and prioritization of energy conservation activities. Competitions for energy use reductions may also be held to further educate and assist in developing good energy use habits among individuals.

Steps	Resources Needed	Time/Cost
Assess current status of energy monitoring and control systems		
Provide recommended EMCS system expansions associated costs		
Program projects and funding necessary to expand and improve upon existing energy monitoring and control systems. Improve energy reporting and energy use accountability.		

Measure: 35% energy reduction compared to 1985 by 2007.

Initiative 1.1.3: Leverage financing, funding, and contracting options, along with improving project reviews to capitalize on sustainable energy opportunities.

Lead: DPW

Action Agents: DPW and DRM

Steps	Resources Needed	Time/Cost
Analyze financing, funding, and contracting options (e.g. Blanket Purchase Agreement [BPA] financing, Energy Conservation Investment Program [ECIP], Energy Savings Performance Contracts [ESPC], utility privatization, Enhanced Use Leasing (EUL))		
Establish procedures, training, and contractor tools that better assure we do not miss out on sustainable energy opportunities.		
Implement new procedure for reviewing opportunities		

Measure: At least one energy decentralization demonstration project by 2007.

Initiative 1.1.4: Analyze and implement policy changes and energy conservation opportunities that will reduce energy consumption.

Lead: DPW

Action Agents: Directorate of Resource Management (DRM), DOC

Steps	Resources Needed	Time/Cost
Baseline the current energy status, determine the key policies that affect energy use and efficiency		
Address any concerns in semi-annual energy policy letters and update local regulations as required		
Assess any improvements from new policies		
Identify energy conservation opportunities and their payback/costs		

Measure: An additional 5% reduction in energy use, based on the 1985 baseline, for a total of 40% reduction, which is 5% more than DOD guidance.

Initiative 1.1.5: Enhance alternative fuels infrastructure and improve utilization of alternative fuels.

Leads: DOL and DPW
Action Agent: DPW

Steps	Resources Needed	Time/Cost
Install E-85 fueling station		
Establish accountability for utilizing alternative fuels in dual fuel vehicles		

Measure: End FY03 with 206 out of 340 alternative fuel vehicles (AFVs), and FY07 with 50% fuels use alternative.

Initiative 1.1.6: Support and encourage research that will provide tactical alternative fuel vehicles (AFVs).

Lead: DOL
Action Agents: DOL with DECAM support

Steps	Resources Needed	Time/Cost
Determine Amy's current plans and progress toward tactical AFVs		
Support Army efforts to conduct field testing of tactical AFV technologies		

Measure: AFV tactical vehicle pilot program in place by 2007.

Objective 1.2: Reduce the amount of water purchased from outside sources by 25% by 2007, using a 2001 (FY01) baseline.

Fort Carson currently does a great job of conserving water; however, we think we can do better. The goal for further reductions of 75 percent by 2027 is extremely aggressive, but must be met if we are to be sustainable.

By reducing water use, Fort Carson will support the state's environment, because much of the water in the area is transported from the western slope of the Colorado Rockies, damaging stream systems on both sides of the mountains. The current water consumption trend in the Pikes Peak Region and subsequent pouring of cleaned used water into the Fountain Creek watershed system is damaging the watershed by eroding stream banks and changing its ecosystems.

Initiative 1.2.1: Implement a landscaping master plan that incorporates no water and low water use alternatives.

Lead: DPW

Action Agents: DPW with DECAM support

Steps	Resources Needed	Time/Cost
Continue refining the Landscaping Master Plan		
Implement Landscaping Master Plan Program landscape projects		

Measure: Amount of potable water purchased from outside sources for irrigation reduced by 25% compared to FY01 by 2007.

Initiative 1.2.2: Increase recycled, reused, and non-potable water use.

Lead: DPW

Action Agents: DPW with DECAM support

Steps	Resources Needed	Time/Cost
Work with CSU and governing organizations to determine feasibility of recycled and/or non-potable water for Fort Carson		
Develop/obtain proposals and costs estimates for water reuse and expanded non-potable water use.		
If necessary, budget funds to implement projects		

Measure: Amount of recycled and non-potable water used increased 5% compared to FY01 by 2007.

Initiative 1.2.3: Reduce water leaks.

Lead: DPW

Action Agent: DPW

Steps	Resources Needed	Time/Cost
Conduct leak study and detection survey of installation water distribution system.		
Determine best avenue to pursue funding and completion of leak repairs		
Research and program ways to better identify leaks such as monitoring and metering equipment		
Replace failing Pinon Canyon waterline sections		

Measures: Leak study and detection survey complete with repairs made, and Pinon Canyon waterline sections replaced.

Initiative 1.2.4: Leverage financing, funding, and contracting options, along with improving project reviews to capitalize on sustainable water opportunities.

Leads: DPW, DRM, DOC

Action Agents: DPW, DRM, DOC

Steps	Resources Needed	Time/Cost
Analyze financing, funding, and contracting options (BPA financing, ECIP, ESPC, utility privatization, Enhanced Use Leasing (EUL))		
Establish procedures, training, and contractor tools that better assure we do not miss out on sustainable water opportunities.		
Implement new procedure for reviewing opportunities		

Measure: At least one sustainable water program (whether technology- or methodology-based) in place by 2007.

Initiative 1.2.5: Install equipment and improve processes to conserve water.

Lead: DPW

Action Agent: DPW

Steps	Resources Needed	Time/Cost
Research largest areas of equipment water consumption and identify in a baseline		
Research the market for equipment that meets specifications and uses the least amount of water such as Energy Star labeled products		
Create awareness to purchasers of these products through e-mails, articles, and contracting		
Improve water irrigation schedules to minimize waste		
Improve the efficiency of irrigation equipment (e.g. efficient sprinkler heads, moisture sensors, etc)		

Measures: At least one water conservation process change and one water conservation comprehensive equipment replacement in place by 2007.

Initiative 1.2.6: Establish a plan and budget for water monitoring meters at all facilities on the Installation.

Lead: DPW

Action Agent: DPW

Steps	Resources Needed	Time/Cost
Research technologies to find least expensive, most reliable technology.		
Develop phased plan with budgeting and installation schedule for meters		

Measure: Water metering plan in place by 2007.

Objective 1.3*:* Increase storm water outfall protection by 25%.

Fort Carson has implemented many measures that protect storm water coming from the installation. Storm water is the water that runs over hard surfaces on the installation and leaves the installation. Storm water is important, because it heats up in the summer after running over heated pavement, picks up pollutants from vehicles, and brings the heat and pollutants to stream systems, damaging the ecosystems within. Fort Carson currently has 56 outfalls, where storm water leaves the Installation.

Initiative 1.3.1: Initiate and implement Phase II Storm water Management Program Plan.
Lead: DPW
Action Agents: DPW with DECAM support

Tasks	Resources Needed	Time/Cost
Create public education and outreach programs through partnerships, displays, articles and other strategies		
Involve the public in protection of water systems		
Detect and eliminate illicit discharges		
Enhance construction runoff control		
Control post-construction site runoff control		
Enhance storm water outfall protection through pollution prevention		

Measure: 25% increase in outfall protection by 2008.

<u>Goal 1 - Sustainable Energy and Water Use:</u> Sustain all facility and mobility systems from renewable sources, and reduce the total water purchased from outside sources by 75%.

<u>Objective 1.1:</u> Increase percentage of facility and mobility systems using renewables to 10% by 2007, and reduce reliance on nonrenewable energy by 3% per year each year for the next five years.

<u>Measures:</u>

40% reduction of nonrenewable energy use by 2007

<u>Target: 6-25 Years</u>

100% of energy purchased from renewable sources
50% of energy decentralized and localized
50% energy reduction compared to 1985
All admin vehicles on Alt. Fuels
25% tactical vehicles on alt. fuels

<u>Target 1-5 Years</u>

10% of energy from renewable sources
35% energy reduction compared to 1985
Energy decentralization demonstration project
AFV tactical vehicle pilot program in place
End FY 03 206 out of 340 alt fuel vehicles
50% of fuels used alternative

<u>Baseline 2002</u>

- 3 % of energy from renewable sources
- Primary energy source Col Spgs Utilities
- 25% energy reduction/SF since 1985
- 50% of vehicles on alternative fuels
- Zero tactical vehicles on alt. fuels

<u>Initiatives:</u>

Develop a plan to assess, list, prioritize, and program renewable energy options

Improve energy efficiency by using better monitoring and control systems

Leverage financing, funding, and contraction options, along with improving project reviews to capitalize on sustainable energy opportunities.

Analyze and implement policy changes and energy conservation opportunities that will reduce energy consumption

Enhance alternative fuels infrastructure and improve utilization of alternative fuels

Support and encourage research that will provide tactical AFVs

<u>Goal 1 - Sustainable Energy and Water Use:</u> Sustain all facility and mobility systems from renewable sources, and reduce the total water purchased from outside sources by 75%.

<u>Objective 1.2:</u> Reduce amount of water purchased from outside sources by 75% using a 2001 (FY01) baseline.

<u>Measures:</u>

25% reduction of purchased potable water

25% reduction in wastewater treated

<u>Target 6-25 Years</u>

Amount of water from outside sources reduced by 75% (total of 256 gallons used per year)

Amount of treated water discharged from the STP reduced by 75% (total of 38 million gallons treated)

<u>Target 1-5 Years</u>

Amount of potable water purchased from outside sources reduced by 30% (718 million gallons used)

Amount of treated water discharged from STP reduced by 30% (358 million gallons discharged)

<u>Baseline 2001</u>

90% of water purchased from external sources (1025 Million gallons)

511 million gallons of treated water from Sewage Treatment Plant

90 million gallons reused

421 million gallons treated water

<u>Initiatives:</u>

Landscaping master plan that incorporates no- and low-water use alternatives

Increase recycled, reused, and non-potable water use

Reduce water leaks

Leverage financing, funding, and contracting options, along with improving project reviews to capitalize on sustainable water opportunities

Install equipment and improve processes to conserve water

Establish a plan and budget for water monitoring meters at all facilities on the Installation

<u>Goal 1 - Sustainable Energy and Water Use:</u> Sustain all facility and mobility systems from renewable sources, and reduce the total water purchased from outside sources by 75%.

<u>Objective 1.3:</u> Increase storm water outfall protection by 25% from a 2001 baseline.

<u>Measures:</u>

Percent of outfall protection measures from the Phase II Storm Water Management Program Plan in place by 2007.

<u>Target: 6-25 Years</u>

Increase outfall protection by 75% by 2027

<u>Target 1-5 Years</u>

Increase outfall protection by 25% more than 2001 baseline.

<u>Baseline 2001</u>

10% of the measures in the Phase II Storm Water Management Program Plan in place.

<u>Initiatives:</u>

Create public education and outreach programs through partnerships, displays, articles and other strategies

Involve the public in protection of water systems

Detect and eliminate illicit discharges

Enhance construction runoff control

Control post-construction site runoff control

Enhance storm water outfall protection through pollution prevention