

Army Net Zero Installation Initiative and Cost Benefit Analysis Activity

Kristine Kingery

Director, Army Sustainability Policy
Office of the Deputy Assistant Secretary of the Army
(Energy & Sustainability)

Report Documentation Page

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Overview

- **Net Zero Installations Initiative**
 - Energy
 - Water
 - Waste

- **Cost Benefit Analysis Plan**
 - Initiative level
 - Army installation level



Net Zero Installations



“The primary goal is a focus toward net zero and when we talk about net zero, it's not only net zero energy, but it's net zero energy, water, and waste. When you look at the term "net zero" or a hierarchy of net zero you must start with reduction, then progress through repurposing, recycling, energy recovery, disposal being the last.”

— HON Katherine Hammack, DoD Bloggers Roundtable, 10 October 2010

- **A Net Zero ENERGY Installation** is an installation that produces as much energy on site as it uses, over the course of a year.
- **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 of that region in quantity or quality.
- **A Net Zero WASTE Installation** is an installation that reduces, reuses, and recovers waste streams, converting them to resource values with zero solid waste to landfill.
- **A Net ZERO INSTALLATION** applies an integrated approach to management of energy, water, and waste to capture and commercialize the resource value and/or enhance the ecological productivity of land, water, and air.



Net Zero Installations





Net Zero Energy

A Net Zero ENERGY Installation is an installation that produces as much energy on site as it uses, over the course of a year.

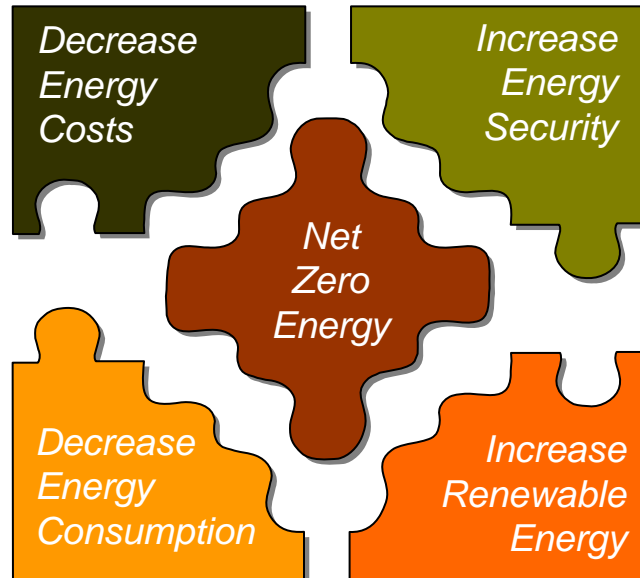
Goals:

- Address energy efficiency & conservation first
- Preference for use of renewable energy for on-site power; enables operation if grid goes down
- Must address redundant energy supply sources
 - Can the installation function for long periods of time during supply disruptions affecting the electric grid, natural gas pipeline, propane & fuel oil deliveries, etc.
- Applies to both electrical & thermal energy
- Must include culture & behavior change
- Must be fiscally responsible





Net Zero Energy Strategy



Requires holistic approach & includes:

- Dramatic demand-side energy use reduction
- Right mix of energy generation technologies & strategies that also increase energy security
- Areas/building clusters served by small Central Utility Plants
- Clear & flexible implementation strategies based on potential technology innovations & mission changes

Need to build & retrofit our building stock today with future energy targets in mind



Getting to NZ Energy in 9 Years



<i>Integrate energy considerations into Master Planning</i>	Develop an energy component as part of the Installation's master planning process
<i>Increase energy efficiency in new construction</i>	Increase the use of energy technologies in construction & major renovation projects that provide the greatest cost-effectiveness, energy efficiency, & support the Army's sustainability objectives
<i>Reduce energy consumption in existing facilities</i>	Eliminate energy inefficiencies that waste natural & financial resources, & do so in a manner that does not adversely impact mission or the comfort & quality of the facilities in which Soldiers, Civilians, Families, & contractors work & live
<i>Reduce dependence on fossil fuels</i>	Reduce dependency on fossil fuels by increasing use of clean, renewable energy, reducing waste, increasing efficiencies, & improving environmental benefits
<i>Improve energy security</i>	Improve the security & reliability of our energy systems to provide dependable utility service, while decreasing dependence on a fragile electric grid



Net Zero Water



A Net Zero WATER Installation limits the consumption of freshwater resources & returns water back to the same watershed so not to deplete the groundwater & surface water resources of that region in quantity & quality over the course of a year

Goals:

- Reduce freshwater demand through water efficiency & conservation
- Access/develop alternate water sources to offset freshwater demand
- Develop water-efficient green infrastructure
- Implement low-impact development to manage stormwater



Elements of Net Zero Water

<i>Water conservation & efficiencies</i>	<ul style="list-style-type: none">▪ Identify & eliminate water inefficiencies (e.g., distribution system losses, evaporation losses)▪ Implement low-impact development strategies that retain stormwater runoff▪ Implement a water conservation awareness campaign to change employee behavior
<i>Water reuse</i>	<ul style="list-style-type: none">▪ Implement water reuse strategies▪ Include gray-water systems in new building designs where cost effective
<i>Water security</i>	<ul style="list-style-type: none">▪ Improve the security & reliability of our water systems to provide dependable water service to critical infrastructure during external service disruptions▪ If served by public water systems, establish alternate water supplies



Long-Term Regional Water Studies



- **Assess 30-year water supply & demand for 15 regions with Army installations**
 - Methodology developed in FY09 at 2 pilot studies
 - Applied to 10 US installations & 3 overseas installations

- Pilot sites**
 - Fort Bliss, TX
 - Fort Bragg, NC
- US sites**
 - Camp Shelby, MS
 - McAlester AAP, OK
 - Fort Benning, GA
 - West Point, NY
 - Fort Hood, TX
 - Fort Carson, CO
 - Fort Campbell, TN/KY
 - Fort Riley, KS
 - Joint Base Lewis-McChord, WA
 - Fort Irwin, CA
- Overseas sites**
 - USAG Humphreys, Korea
 - USAG Grafenwoehr, Germany
 - USAG Vicenza, Italy



Net Zero Waste



A Net Zero **WASTE** Installation

reduces, reuses, & recovers waste streams, converting them to resource values with zero solid waste to landfill over the course of a year

Goals:

- *Eliminate unnecessary purchase of materials*
- *Minimize amount waste generated wherever feasible*
- *Expand efforts to re-purpose & recycle/divert used materials*
- *Use Waste-to-Energy technologies for waste that can't be avoided, re-purposed, recycled, or composted*
- *Eliminate landfill disposal to the maximum extent feasible*



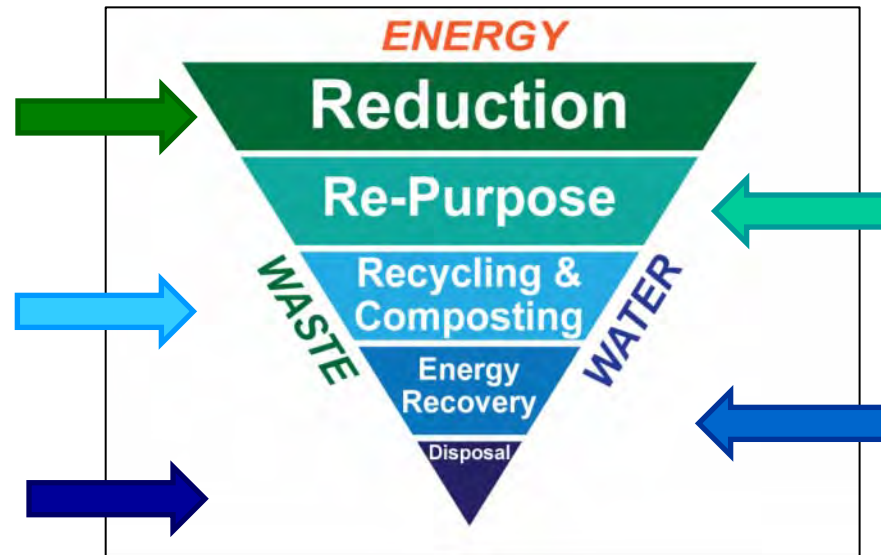
Net Zero Waste Hierarchy

Pilot Installations should have a comprehensive program that starts at the top of the hierarchy

Waste avoidance via procurement practices & other P2 efforts

All recyclable or compostable waste collected & diverted (to on- or off-post facilities)

WTE ash (if not further diverted) & any limited special wastes



Installation re-use centers & efforts to match waste stream 'products' with potential users (e.g., crushed drywall used for soil amendment; C&D debris reuse)

Waste that can't be re-used, recycled, or composted is sent to a WTE plant (on- or off-post)



Cost Benefit Analysis Plan

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PMP/OSM

- G8 and ASA (I,E&E) currently investigating specific areas of Army mission through the Army Strategic Analysis process agreeing on an Energy Security Investment focus, to reduce reliance on fossil fuel.
- ASA (I,E&E) in league with the U. S. Department of Energy (DOE) and its National Renewable Energy Laboratory (NREL) is accomplishing the “**Energy Security Investment**” ***Business Case Analysis (BCA)*** toward secure / uninterrupted energy for: Installations, Tactical Operations, and Soldier Training
- Once an overall Army BCA is accomplished then the focus lens will realign to specific Army areas of interest (e.g. Net Zero and its specific projects)
- Coinciding with the ASA (I,E&E) and DOE NREL BCA, Army installations will accomplish Life-Cycle Costing (LCC) for economic evaluation of energy / water conservation projects and renewable energy projects per DOE LCC Manual, US Code Title 10, GAO Cost Estimating and Assessment Guide, & Army CBA Guide.
- Establish policies that coincide with BCA, Cost Benefit Analyses (CBA), LCC, etc.



QUESTIONS