U.S. Army
Net Zero Waste

Interagency Sustainability Working Group
21 July 2016

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US Army Net Zero

Drivers

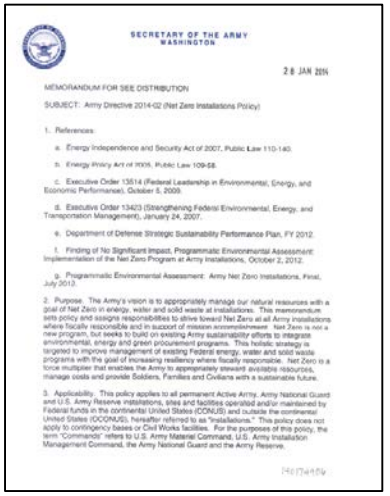
- Federal & DoD sustainability mandates
- Utility disruptions
- Energy security & reliability
- Water security
- Climate change
- Increased costs
- Environmental concerns

Launched as a Pilot

Energy pilots: 9
Waste pilots: 8
Water pilots: 8
Integrated pilots: 2

Evolution

- Army Directive 2014-2
  - **Army-wide implementation**
  - Integrated design with Net Zero end goal



SECRETARY OF THE ARMY
WASHINGTON

28 JAN 2014

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Army Directive 2014-02 (Net Zero Installations Policy)

1. References:

a. Energy Independence and Security Act of 2007, Public Law 110-140.

b. Energy Policy Act of 2005, Public Law 109-58.

c. Executive Order 13514 (Federal Leadership in Environmental, Energy, and Economic Performance), October 5, 2009.

d. Executive Order 13423 (Strengthening Federal Environmental, Energy, and Transportation Management), January 24, 2007.

e. Department of Defense Strategic Sustainability Performance Plan, FY 2012.

f. Finding of No Significant Impact, Programmatic Environmental Assessment: Implementation of the Net Zero Program at Army Installations, October 2, 2012.

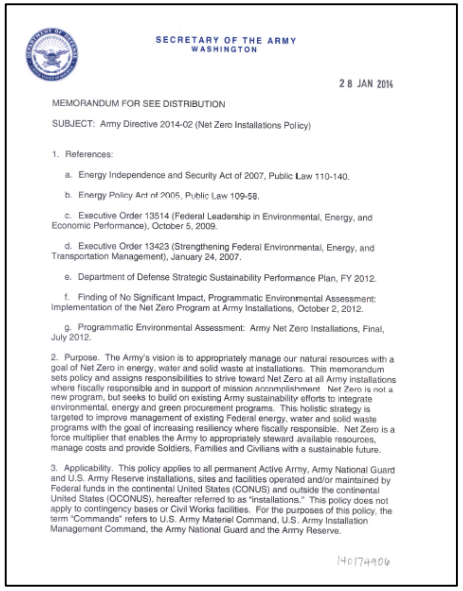
g. Programmatic Environmental Assessment: Army Net Zero Installations, Final, July 2013.

2. Purpose. The Army's vision is to appropriately manage our natural resources with a goal of Net Zero in energy, water and solid waste at installations. This memorandum sets policy and assigns responsibilities to strive toward Net Zero at all Army installations where fiscally responsible and in support of mission accomplishment. Net Zero is not a new program, but seeks to build on existing Army sustainability efforts to integrate environmental, energy and green procurement programs. This holistic strategy is targeted to improve management of existing Federal energy, water and solid waste programs with the goal of increasing resiliency where fiscally responsible. Net Zero is a force multiplier that enables the Army to appropriately steward available resources, manage costs and provide Soldiers, Families and Civilians with a sustainable future.

3. Applicability. This policy applies to all permanent Active Army, Army National Guard and U.S. Army Reserve installations, sites and facilities operated and/or maintained by Federal funds in the continental United States (CONUS) and outside the continental United States (OCONUS), hereafter referred to as "installations." This policy does not apply to contingency bases or Civil Works facilities. For the purposes of this policy, the term "Commands" refers to U.S. Army Material Command, U.S. Army Installation Management Command, the Army National Guard and the Army Reserve.

http://www.asaie.army.mil/Public/ES/netzero

Army Directive 2014-02



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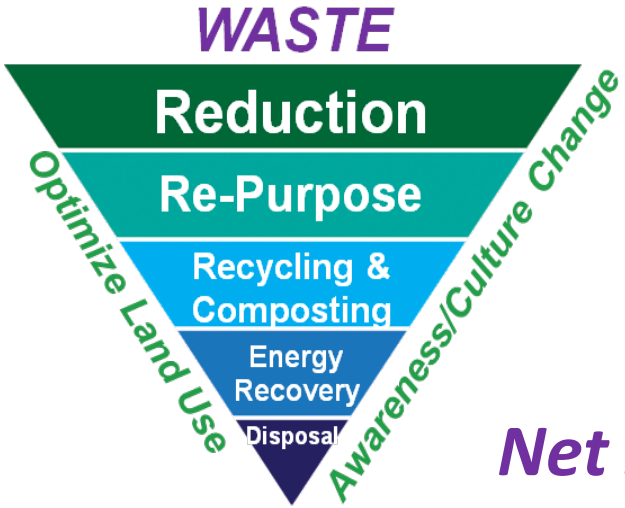
- **Applies to all 'permanent' installations**
- **Builds on long-standing sustainability efforts**
- **Implements Net Zero to the maximum extent practical & fiscally prudent**
  - Leverage existing programs & resources where practical
  - Use lifecycle cost analysis
- **Timelines:**
  - Pilots: continue to strive toward Net Zero by FY2020
  - Other installations: on-going

Net Zero Waste



A Net Zero WASTE Installation reduces, reuses, and recovers waste streams, converting them to resource values with zero solid waste to landfill.

Net Zero is a comprehensive program that starts at the top of the hierarchy

Tools:

- ✓ Waste characterization
- ✓ Material flow analysis
- ✓ Green purchasing
- ✓ Integrated waste management plan
- ✓ Recycling Program

Pilot Installations – Waste	
Fort Bliss, TX	Fort Carson, CO
Fort Detrick, MD	Fort Hood, TX
Fort Hunter Liggett, CA	Fort Polk, LA
JB Lewis-McChord, WA	USAG Bavaria, GER

Reduction

- **HQ Army policies begin to focus on waste avoidance**
  - Sustainable design policy: deconstruction
  - Food donation policy
- **Improved procurement**
  - Buy less (e.g., central supply)
  - Packaging: eliminate (e.g., dispensers vs. single-use) or re-engineer (e.g., Meals Ready to Eat)
  - Recyclable content (e.g., furnishings)
  - New fact sheets for types of procurement
- **Other programs & practices**
  - Electronic (vs. paper) document management
  - Training exercises adjusted to reduce waste

Say No to Styrofoam

Re-Purpose & Reuse

- **Re-use centers on Post**
- **Match waste 'products' with potential users**
  - Drywall as a soil amendment
  - Crushed porcelain as road base
- **On-Post yard sales**
- **Donations to charitable organizations**
  - End-of-life / excess furniture
  - Building components
  - Pre-consumer food

End-of-Life furniture donations

porcelain collection

Goodwill Industries International, Inc.

Habitat for Humanity®

Recycling & Composting

- Installation recycling centers
- Curb-side recycling
- Waste-stream specific efforts
  - Pallets
  - Electronics
- Food waste & organics composting
- Incentives to improve Units' recycling

Electronics recycling

Fort Hood recycling center

Fort Bliss Wood Pallet Recycling Flyer

Joint Base Lewis-McChord composting

Incentives for Units to recycle

Other Elements

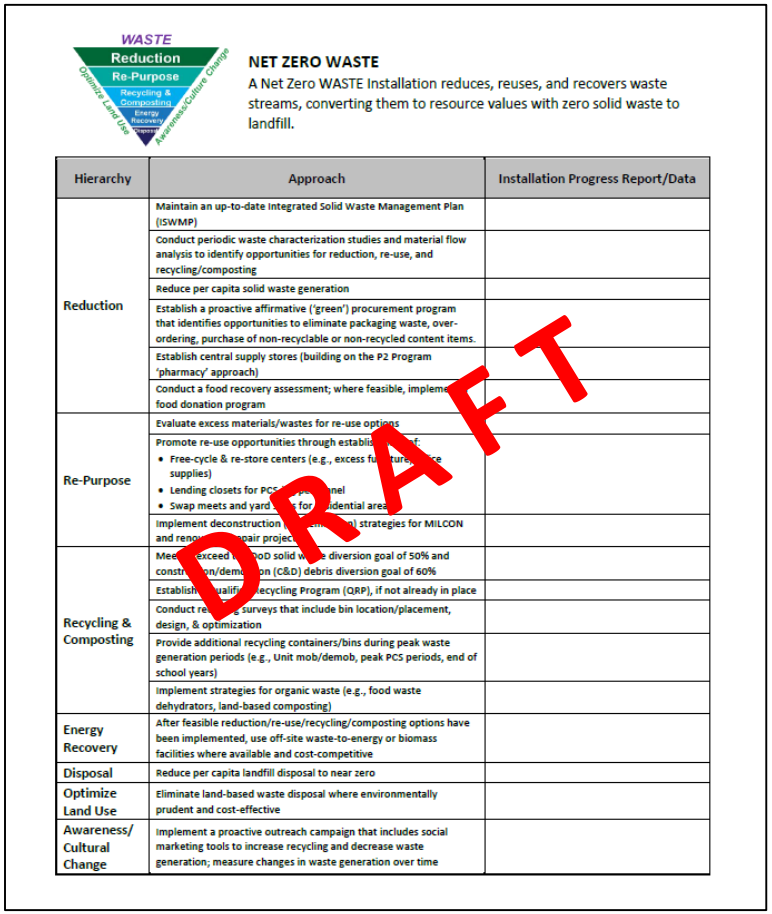
Energy Recovery

- Only after maximizing avoidance & diversion
- Only where economically feasible
- Consideration given to end-products

Disposal

- Last resort after other economically-feasible efforts are implemented

Validating Net Zero



NET ZERO WASTE
A Net Zero WASTE Installation reduces, reuses, and recovers waste streams, converting them to resource values with zero solid waste to landfill.

Hierarchy	Approach	Installation Progress Report/Data
Reduction	Maintain an up-to-date Integrated Solid Waste Management Plan (ISWMP)	
	Conduct periodic waste characterization studies and material flow analysis to identify opportunities for reduction, re-use, and recycling/composting	
	Reduce per capita solid waste generation	
	Establish a proactive affirmative ('green') procurement program that identifies opportunities to eliminate packaging waste, over-ordering, purchase of non-recyclable or non-recycled content items.	
	Establish central supply stores (building on the P2 Program 'pharmacy' approach)	
	Conduct a food recovery assessment; where feasible, implement food donation program	
Re-Purpose	Evaluate excess materials/wastes for re-use options	
	Promote re-use opportunities through establishment of: • Free-cycle & re-store centers (e.g., excess furniture, office supplies) • Lending closets for PCS military personnel • Swap meets and yard sales for residential areas	
	Implement deconstruction (vs. demolition) strategies for MILCON and renovation/repair projects	
Recycling & Composting	Meet or exceed DoD solid waste diversion goal of 50% and construction/demolition (C&D) debris diversion goal of 60%	
	Establish a Qualified Recycling Program (QRP), if not already in place	
	Conduct recycling surveys that include bin location/placement, design, & optimization	
	Provide additional recycling containers/bins during peak waste generation periods (e.g., Unit mob/demob, peak PCS periods, end of school years)	
	Implement strategies for organic waste (e.g., food waste dehydrators, land-based composting)	
Energy Recovery	After feasible reduction/re-use/recycling/composting options have been implemented, use off-site waste-to-energy or biomass facilities where available and cost-competitive	
Disposal	Reduce per capita landfill disposal to near zero	
Optimize Land Use	Eliminate land-based waste disposal where environmentally prudent and cost-effective	
Awareness/ Cultural Change	Implement a proactive outreach campaign that includes social marketing tools to increase recycling and decrease waste generation; measure changes in waste generation over time	

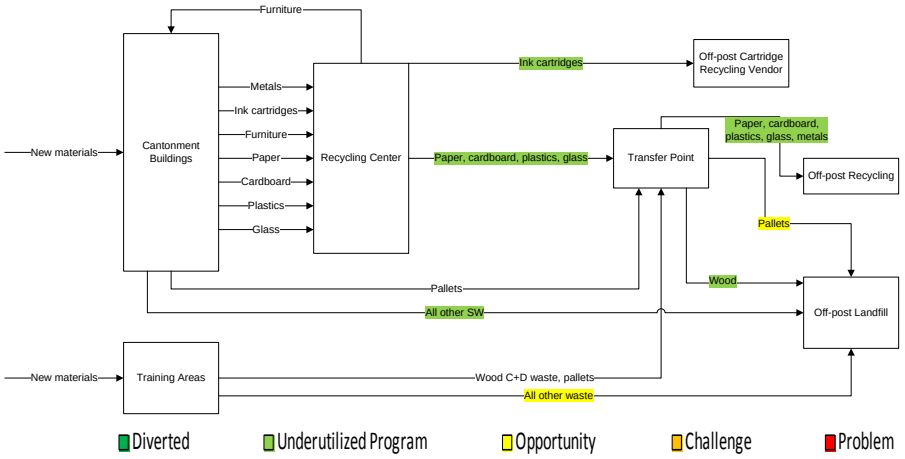
When have you achieved Net Zero?

- Federal & DoD goals have been achieved
  - e.g., EISA 07, NDAA, & EO goals
- Elements in each step of the hierarchy have been maximized

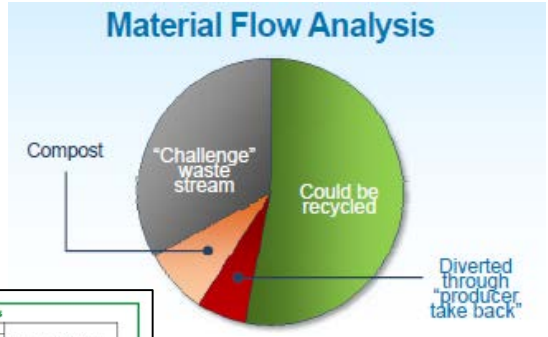
A validation checklist is in development

Tools

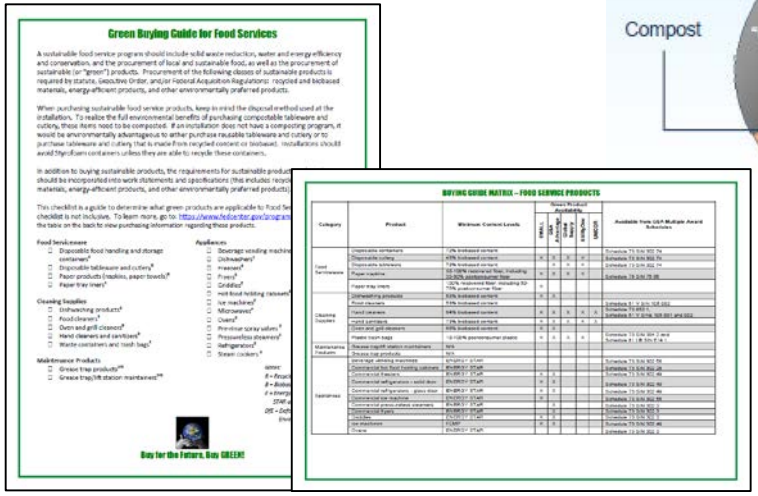
- Waste characterization
- Material flow analyses
- Green purchasing
- Integrated waste management plan
- Command tracking
- Technology assessments for residual wastes



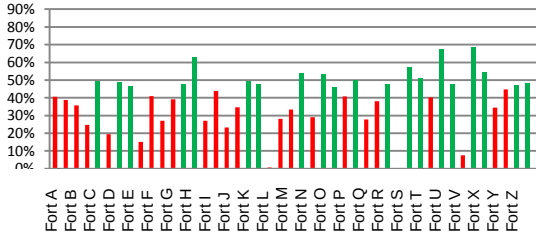
Material Flow Analysis



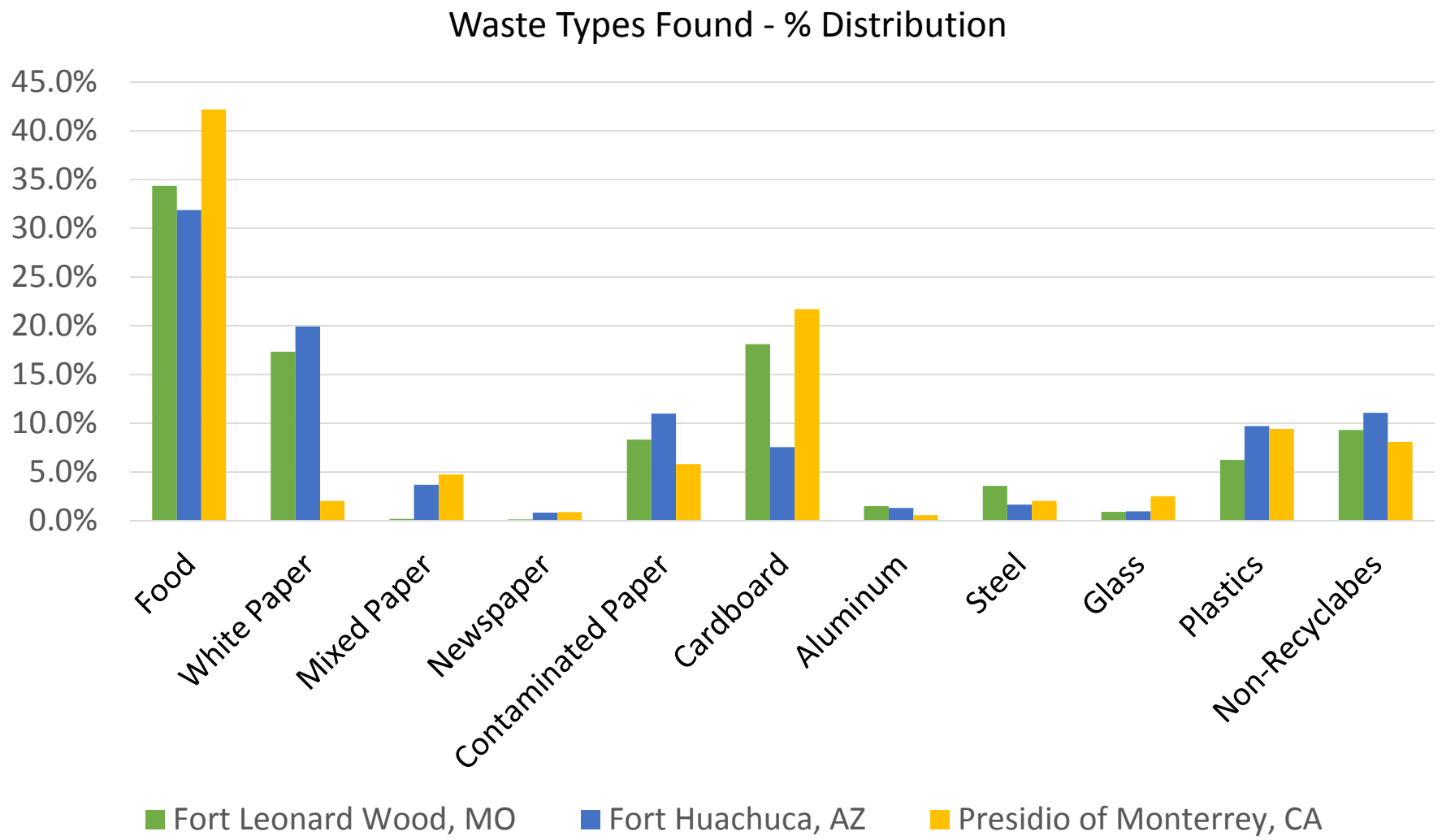
Green purchasing Guide



Command Tracking



Typical Waste Composition



Organic Waste Efforts

- **Food donation policy**
- **Food waste treatment**
  - Land-based composting
  - Dehydration systems
  - In-vessel digestion
  - WWTP augmentation

Embedded in Sustainable Design Policy

vi. Waste & Recyclables Management.

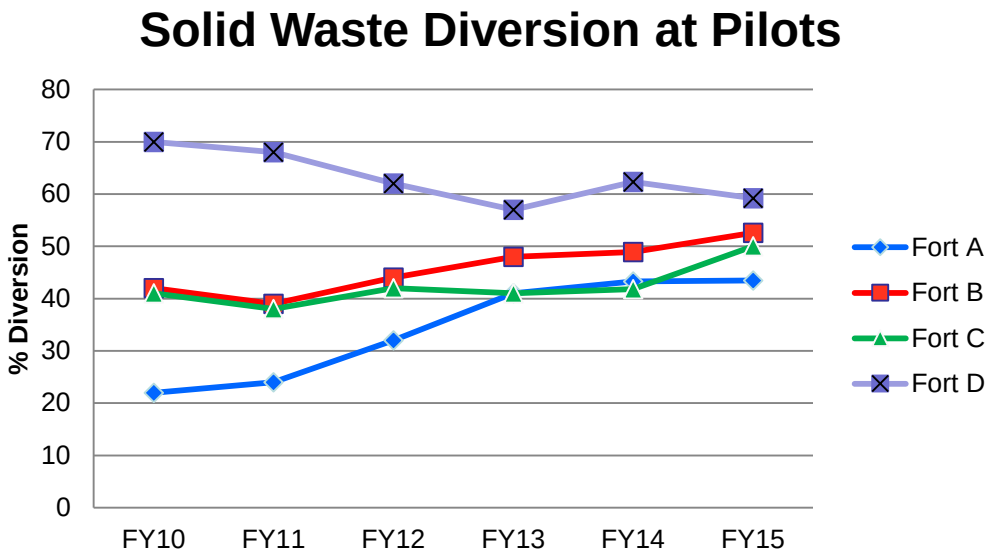
(a). Construction Waste Management. The DoD Strategic Sustainability Performance Plan (SSPP) (reference 1.r) requires that at least 60% of construction and demolition debris be diverted from the waste stream. However, it is the Army's intent to manage waste with the goal of Net Zero waste disposal in landfills (reference 1.w). Therefore, projects that involve the removal of existing buildings or structures will evaluate the feasibility of deconstruction and salvage rather than conventional demolition (reference 1.x), and will implement deconstruction wherever markets or on-site reuse opportunities exist or are anticipated.

(b). Storage & Collection of Occupants' Recyclables & Reusable Goods. The DoD SSPP requires that at least 50% of non-hazardous solid waste be diverted from the waste stream. To support this SSPP goal and the Army's Net Zero waste goal, projects will adhere to ASHRAE 189.1-2014 Section 9.3.4 and will provide conveniently located and appropriately sized space for reuse and recycling for building occupants.

Progress to Date

Army-wide Diversion

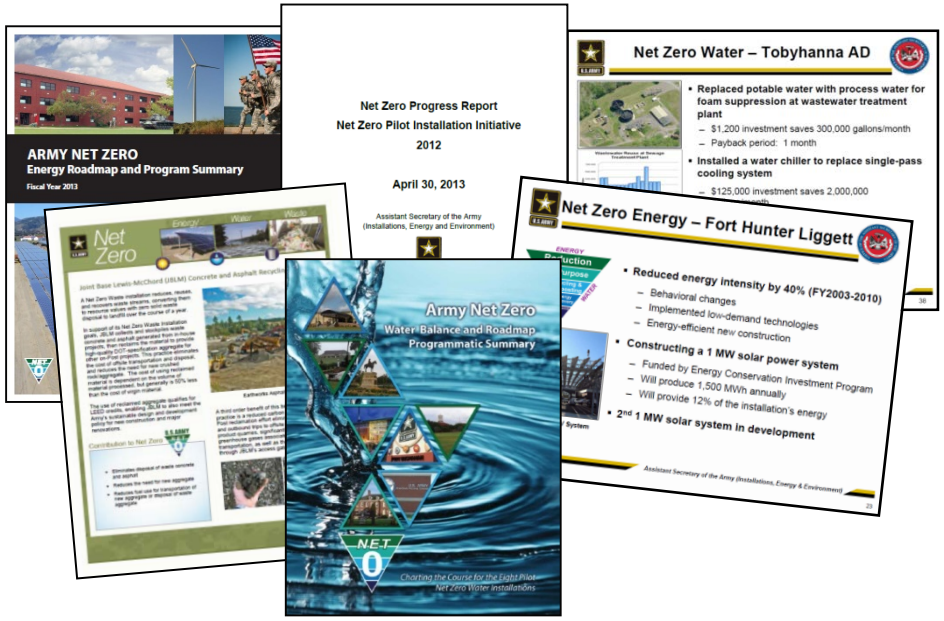
	Solid Waste	C&D Debris
FY2010	38%	73%
FY2015	51%	77%



Communicate & Collaborate

Internally

Best Practices & Success Stories



http://www.asaie.army.mil/Public/ES/

Externally

CENTRAL TEXAS SUSTAINABLE COMMUNITIES PARTNERSHIP

EPA United States Environmental Protection Agency

GSA

Habitat for Humanity®

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