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SANDIA MATERIALS SUSTAINABILITY AND POLLUTION PREVENTION



Zero Waste Goal – Next Steps

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Agenda (to achieve zero energy waste)

- Fool-proof the economizers
- Eliminate Reheat
- VSD Chillers with Variable Primary Pumping
- Fool-proof the daylight harvesting controls
- LED lighting throughout
- Eliminate Data Center Energy Pigs
- Replace federally subsidized coal electricity with federally subsidized renewable energy electricity
- Or.....telecommuting for all



Actual Agenda

- Formulating a Zero Waste (by 2025) Strategic Plan
- Seeking Upper Management endorsement of the Goal
- Waste Characterization Studies
- Zero Waste Branding Campaign
- Objectives/Targets in the annual Corporate EMS Plan
- Net Zero target in the FY16 SSPP
- Joined US Zero Waste Business Council, for the ultimate goal of Zero Waste facility certification



Materials Sustainability & Pollution Prevention (MSP2)

- Vision - The MSP2 program promotes and integrates materials sustainability into all SNL/NM operations.
- In 2008, set our goal of Zero Waste to Landfill by 2025; updated our Vision Statement
- 2012, changed our name from P2 to MSP2
- 2015, began work on our Zero Waste branding campaign



REDUCE • REUSE • RECYCLE • BUY GREEN



What is meant by Zero Waste?

- A vision/journey – similar to zero defects, zero injuries, zero customer complaints, [Vision Zero Initiative](#)
- Zero Waste is the goal, and the performance metric is > 90% diversion from being sent to a landfill or incinerator.
- Helps achieve energy use, water use and greenhouse gas emission reductions
- MSP2: Endeavor to guide Sandia to move from waste management to resource management, i.e. managing resources better and managing waste to become resources.

Why Zero Waste?

- Seeking Continuous Improvement
 - SNL/NM had exceeded DOE goals for recycling
- Can't get there by only Recycling
 - Include “avoid”, re-design” & “buy green” in the new zero waste hierarchy
 - Reduce the Wasteberg and associated GHG emissions





Zero Waste Planning

- Zero Waste by 2025 Strategic Plan – developed in 2014
 - Impetus – seemed we had **plateaued**
 - Enlisted consultant expert in Zero Waste planning
 - **Benchmarked** with fellow DOE/NNSA Labs & other DOE sites
 - Onsite visit, **interviews with staff, partners, participants**
- ➔ Need to **work on behavioral change** as much as infrastructure
 - Outbrief with Direct and Upper Management
 - Very engaged, with one major piece of advice:
- **Communications Plan** – developed in 2015
 - Multi-faceted, multi-media
 - New branding was important



Zero Waste Plan recommendations

Tools for Ensuring Progress

- **Monthly Data Tracking**
- Recycling Opportunity Assessment every 4 years
- **Waste Characterization Study every 2-3 years**
- **Internal Waste Analyses annually**
- Tactical Road Map – list steps required to complete the strategy
- Annual Budget - forecast of requirements and targets for upcoming year
- Semi-annual **Business Review to leadership**

Next Steps

- *Gain Executive Management Support for Zero Waste Corporate Goal*
- **Initiate steps for recycling improvements and compost expansion**
- **Determine team for branding, signage and education project**
- **Integrate findings from 2014 Waste Characterization Study**
- **Join USZWBC for info and to get certified**



Benchmarking (2014) other DOE Sites

■ NNSA sites (all 8 responded)

- **LANL:** Want to do ZW Plan
- **Y-12:** Going down this path but no formal plan

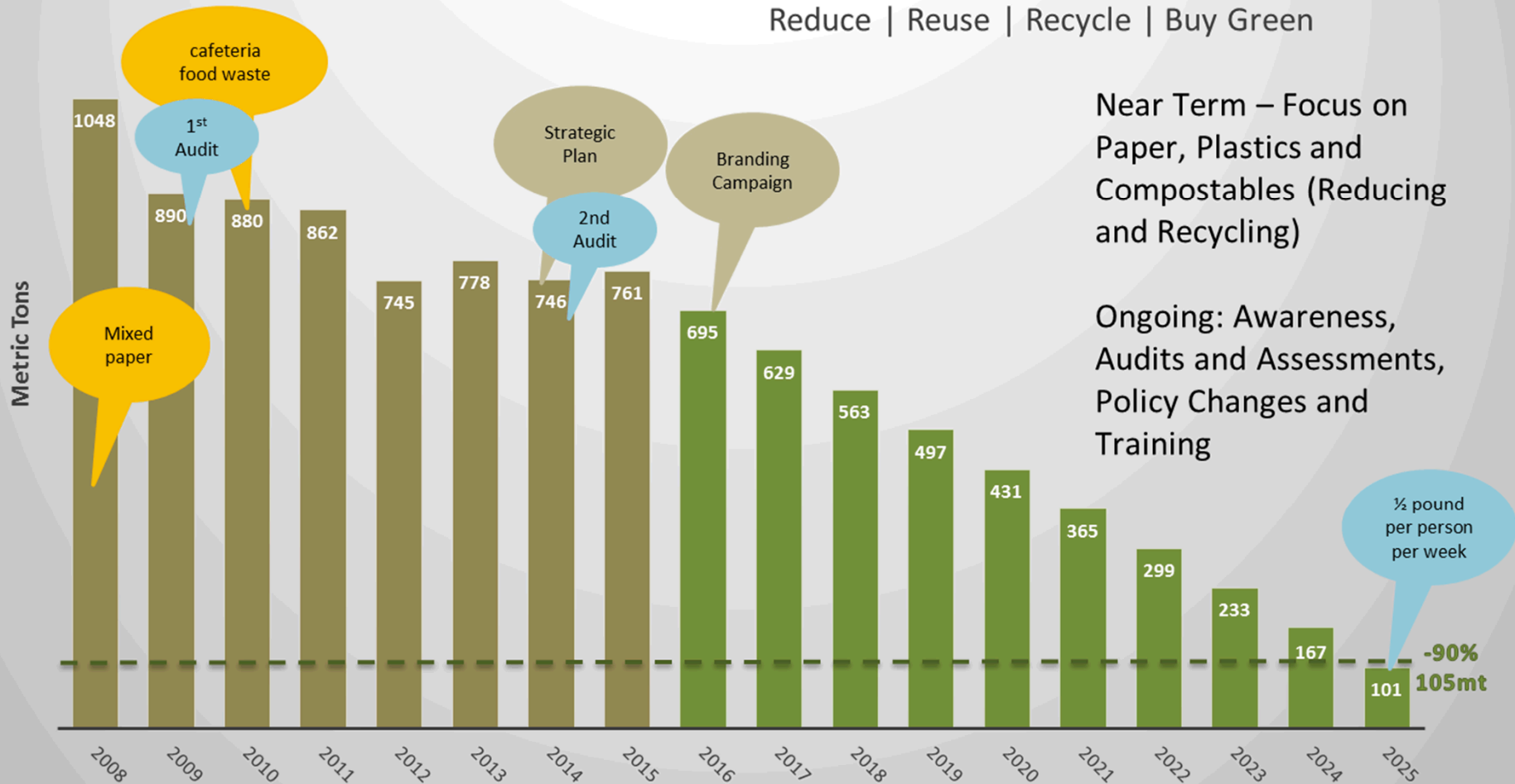
■ Other DOE sites (9 responses)

- **LBNL:** At 75% and Target is ZW by 2020
- **SLAC:** Began Pursuing ZW in 2008; Goal is 75% by 2020
- **WIPP:** (Waste Isolation Pilot Plant in southern NM)
- **BPA:** At 75% now. Portland State University does waste audits annually



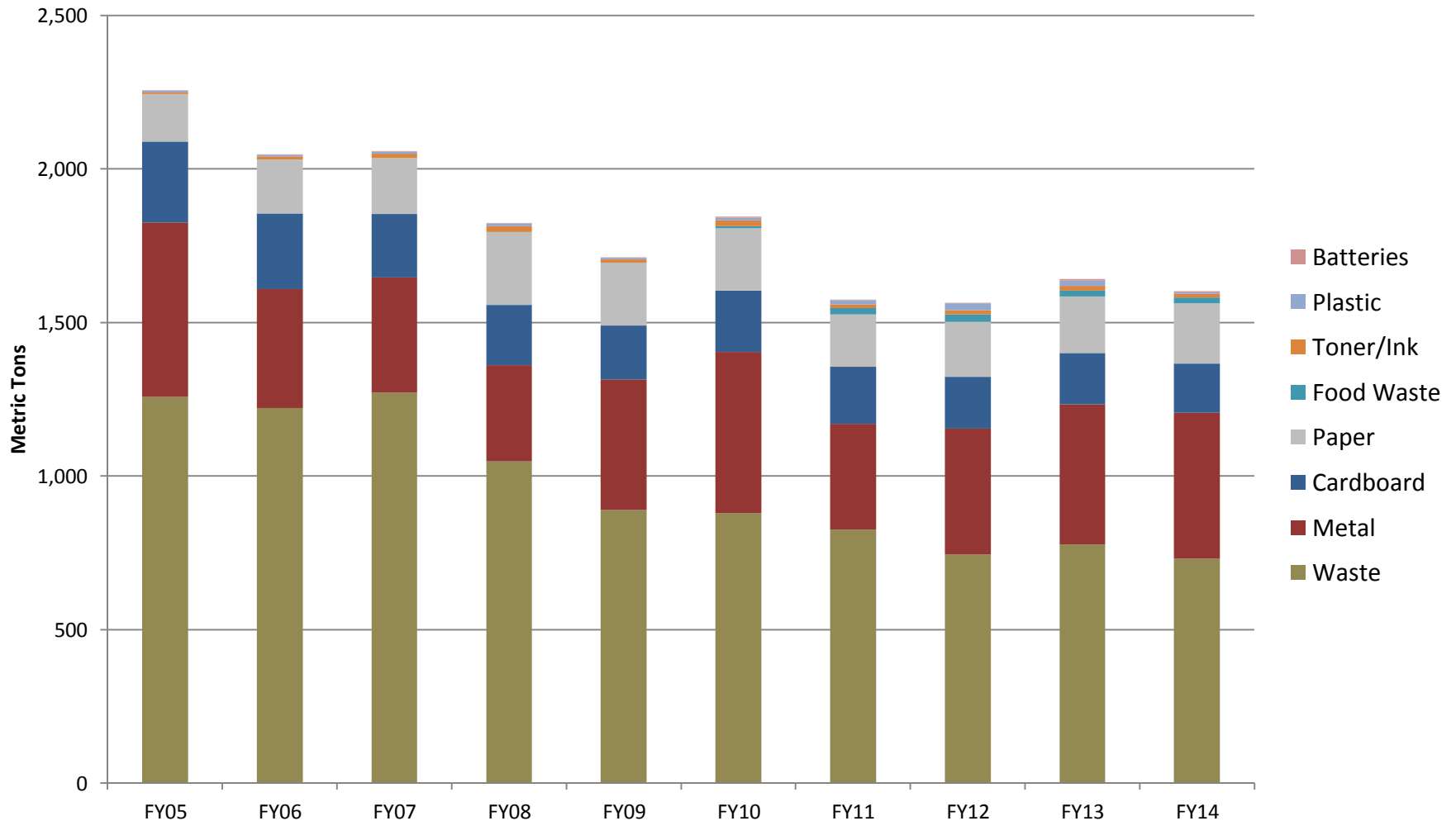
Solid Waste: *How to Get to "Zero"*

Reduce | Reuse | Recycle | Buy Green



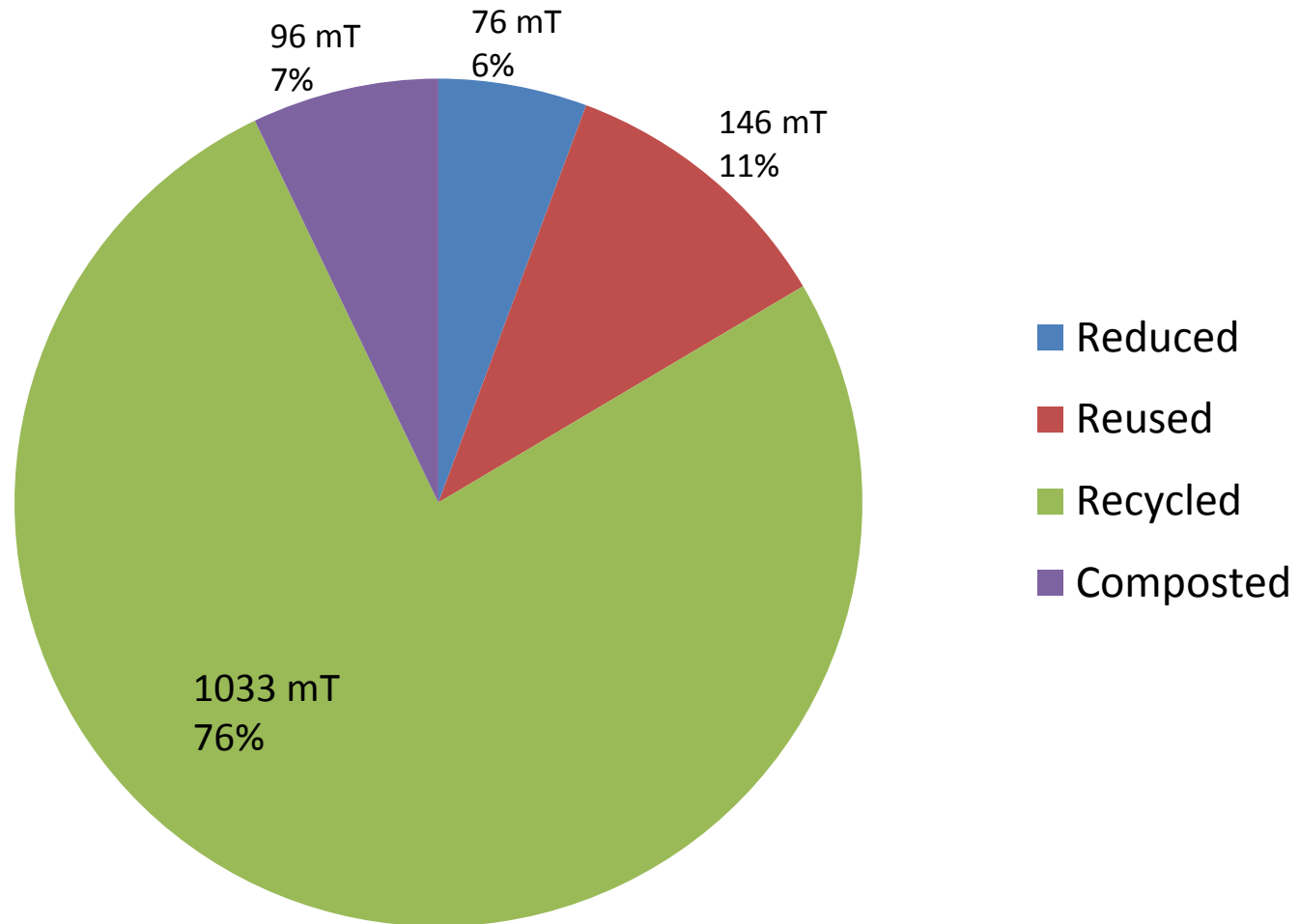


Waste & Diversion Trend





FY14 Waste Diversion breakdown





Waste Audit 2014 – comparison of two office buildings

Component	Percentage*		
	823	831/832	Difference
Cardboard	6.91	8.72	-1.81
White Paper	11.29	6.23	5.05
Wet Paper	14.88	9.33	5.55
Total Mixed Paper	25.76	29.39	-3.63
Total Other Paper	14.90	9.39	5.51
PET #1	3.04	2.23	0.81
HDPE #2	0.48	0.64	-0.16
Other Plastics	16.38	24.21	-7.83
Aluminum Cans	1.22	0.87	0.35
Putrescible Waste	17.48	15.21	2.27

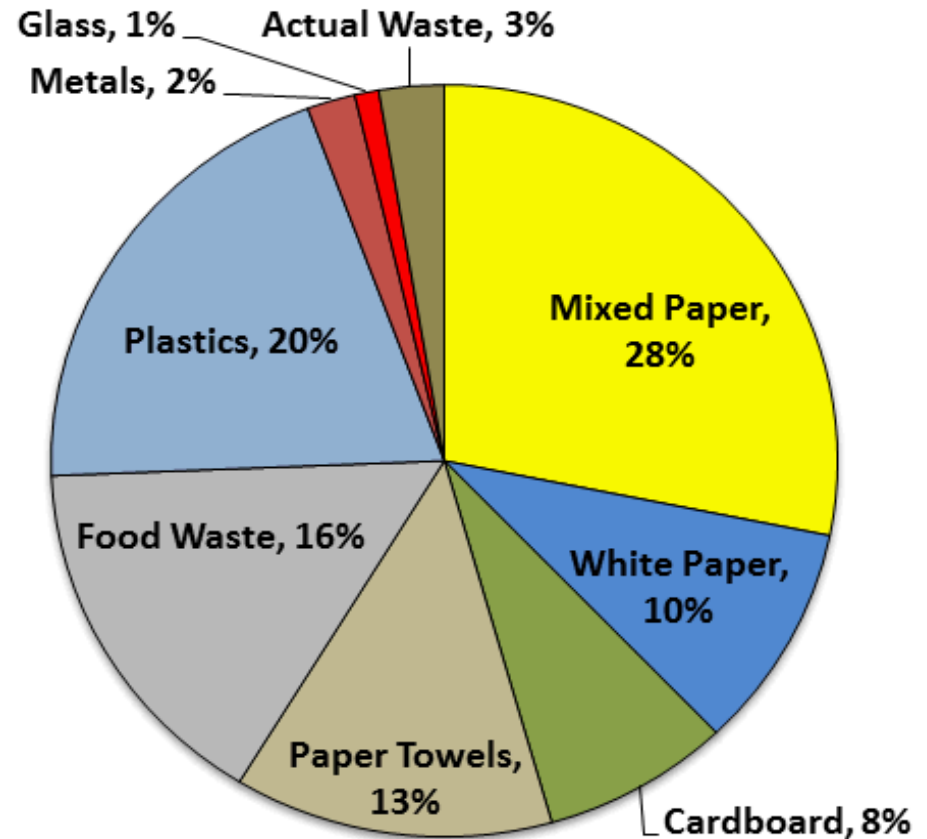
** Percentage for each of the waste stream components of the total waste stream measured*

What's left in Sandia's trash?

2015 TRASH

1,612,000 pounds

Mixed Paper	451,000
White Paper	161,000
Cardboard	129,000
Paper Towels	210,000
Food Waste	258,000
Plastics	322,000
Metals	32,000
Glass	16,000





Waste Audit 2016 – two office/lab buildings

Waste Stream	897	858EL	Combined
Cardboard	1.09%	2.04%	1.64%
Mixed Paper	18.55%	14.30%	16.09%
White Paper	1.54%	1.19%	1.34%
Compostable Paper	18.23%	25.55%	22.48%
Putrescible Waste	14.45%	19.24%	17.23%
#1 PET Bottles	0.68%	1.46%	1.13%
Other Rigid Plastics	11.05%	8.19%	9.39%
Custodial Liners	5.60%	6.07%	5.87%
Total Sample weight, lbs	309	427	736
Total Population	187	319	506
Pounds/Person/Week	1.65	1.33	1.45

Percentage for each of the waste stream components is of the total waste stream measured



Familiar Refrain – Behavior Change

	Motivation	Ability
PERSONAL	Help People Love what they Hate (Values)	Help people do what they can't (knowledge, skills, ability)
SOCIAL	Provide encouragement (peer pressure, peer support)	Provide Assistance (Teamwork)
STRUCTURAL	Change their Economy (Incentives)	Change their Environment (infrastructure, accommodating, convenient)



Zero Hero Campaign

ZERO WASTE → 2025

BE A PAPER TOWEL MINIMIZING, SHAKE AND FOLD PRACTICING, CAPE WEARING, ZERO HERO!

ZeroWaste.sandia.gov

The U.S. uses more than 13 billion pounds of paper towels each year and that number is growing steadily.

Reduce • Reuse • Recycle • Buy Green

ZERO WASTE → 2025

BE A PRINTER CARTRIDGE REUSING, LANDFILL CRUSHING, CAPE WEARING, ZERO HERO!

ZeroWaste.sandia.gov

Sandians used 10,420 printer cartridges in 2015. 90% of those cartridges were purchased new instead of remanufactured.

Reduce • Reuse • Recycle • Buy Green

ZERO WASTE → 2025

BE A POT BREWING, K-CUP SHUNNING, CAPE WEARING, ZERO HERO!

ZeroWaste.sandia.gov

ZERO WASTE → 2025

BUY GREEN

Stock and use only 100% recycled content copy paper

Use remanufactured toner cartridges on existing B/W laser printers

Search the keyword "recycled" on Sandia's JIT Marketplace

Lease a networked Fleet Copier instead of purchasing a non-supported large printer

ZeroWaste.sandia.gov

ZERO WASTE → 2025

RECYCLE

Make a shredder or destruction bag available for sensitive information

Have white and mixed paper recycle bins available for all non-sensitive paper

Put recycle bins for Aluminum and Plastics in the break room

Place mixed paper packaging materials from meals and products in recycle bins

ZeroWaste.sandia.gov

ZERO WASTE → 2025

REUSE

Check Sandia's Toner Exchange for color and B/W toner and ink cartridges

Take a department shopping list to Reapplication monthly

Establish and maintain an orderly Binder Reuse Area

Utilize removable file labels on folders, binders, and other supplies

ZeroWaste.sandia.gov

ZERO WASTE → 2025

REDUCE

Use rechargeable batteries where possible and recycle all alkaline batteries

Use washable water bottles, coffee mugs, utensils, and plates

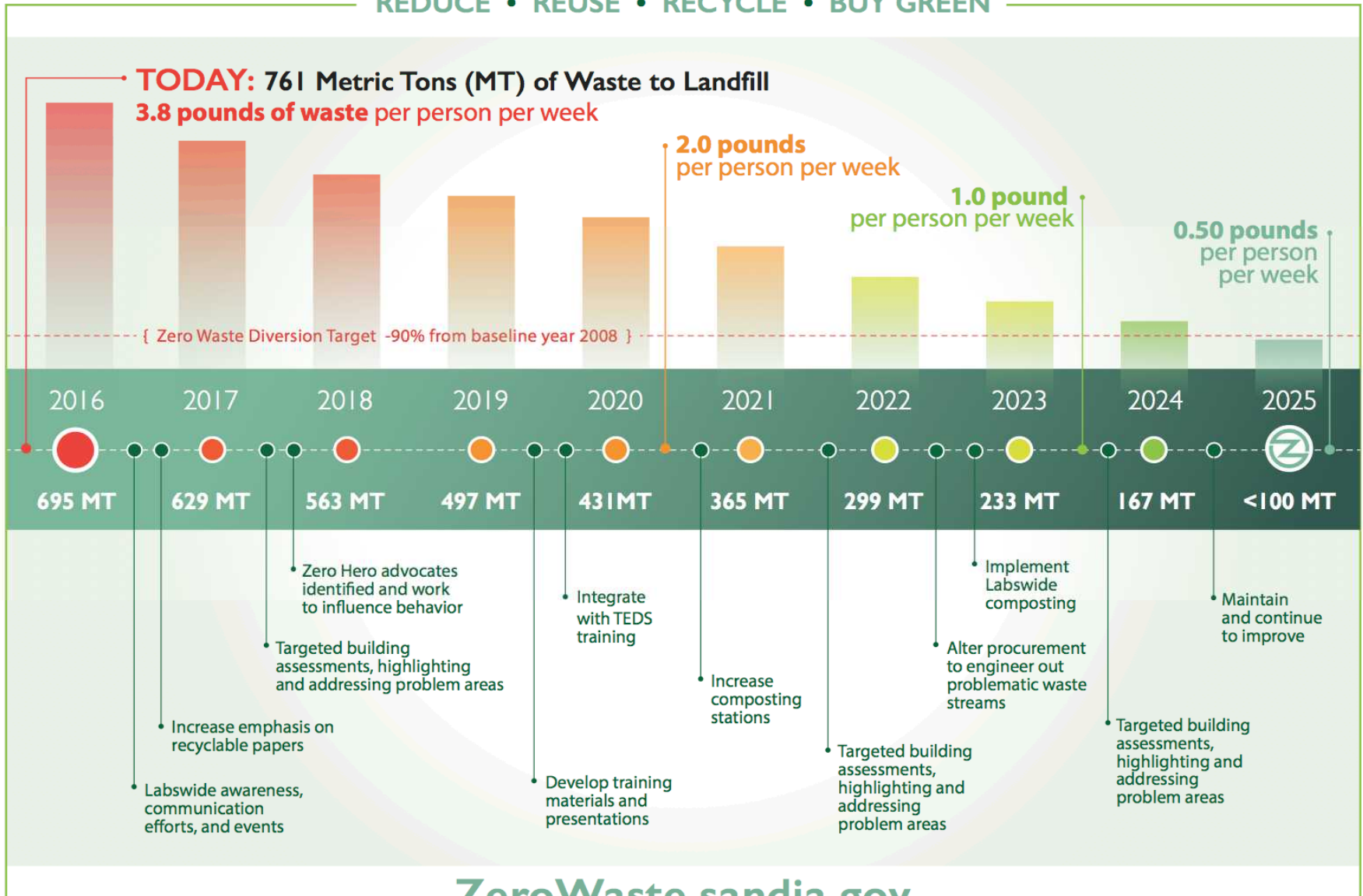
Provide presentations and meeting agendas electronically, not in hardcopy

Print double-sided, and in general only print when necessary

ZeroWaste.sandia.gov

SANDIA'S JOURNEY TO ZERO WASTE

REDUCE • REUSE • RECYCLE • BUY GREEN



Lean & Green Collaboration

- Combine Lean Six Sigma thinking with Zero Waste thinking for maximum impact at Sandia in pursuing Zero Waste goal
 - Corporate LSS office proposing we leverage the Black Belts and Green Belts to incorporate into their Lean events
 - Perform Zero Waste office assessments
 - Pilot use of the mini-bins





Zero Waste in Corporate EMS – FY17 O/T's

- Increase Mixed Paper Recycling per Quarter – from 35K pounds to 40K pounds

In Division (Work Unit) Plans

- Department Zero waste office assessments (all divisions)
 - Perform and follow-up on 10 assessments
- Deliver Five Zero Waste presentations
- Zero Waste information in the Porcelain Press – Frequency TBD
- Building waste analysis
 - 2 for buildings with 100 or less occupants

Journey to Zero Waste by 2025

*Recent shipment of
PLASTICS: 11 tons*

Recycle revenue earned: \$434

Landfill cost avoided: \$651

Benefit to Sandia: \$1,085



*First shipment of
NITRILE GLOVES*

**Weight Recycled:
770 pounds**

3D PRINTER CARTRIDGES

**Recycled-to-date:
1,742 pounds**





DOE's Net Zero Targets – FY16 SSPP

What does Net Zero Mean?

US DEPARTMENT OF ENERGY STATES:

- Net Zero Waste:
 - "...means a building that is operated to reduce, reuse, recycle, compost, or recover solid waste streams (with the exception of hazardous and medical waste) thereby resulting in zero waste disposal."
 - https://www4.eere.energy.gov/femp/requirements/laws_and_requirements/definition_net_zero_waste_building_operated



- FY15 – DOE diverted 55% MSW
- FY17 (zero waste goal):
 - Pursue opportunities for net zero waste
 - Share lessons learned and best practices
 - Develop a database of best practices & tools
 - Assess existing strategies and start planning to achieve zero waste (by 2030)

Target – 1% of building stock (over 5000 SF) is Net Zero (Energy, Waste and/or Water) by 2025, consisting of new facilities or existing facilities



“But what ABSOLUTELY SOLD ME was the bale of recycled cans – along with a poster talking about the recycling life cycle.”

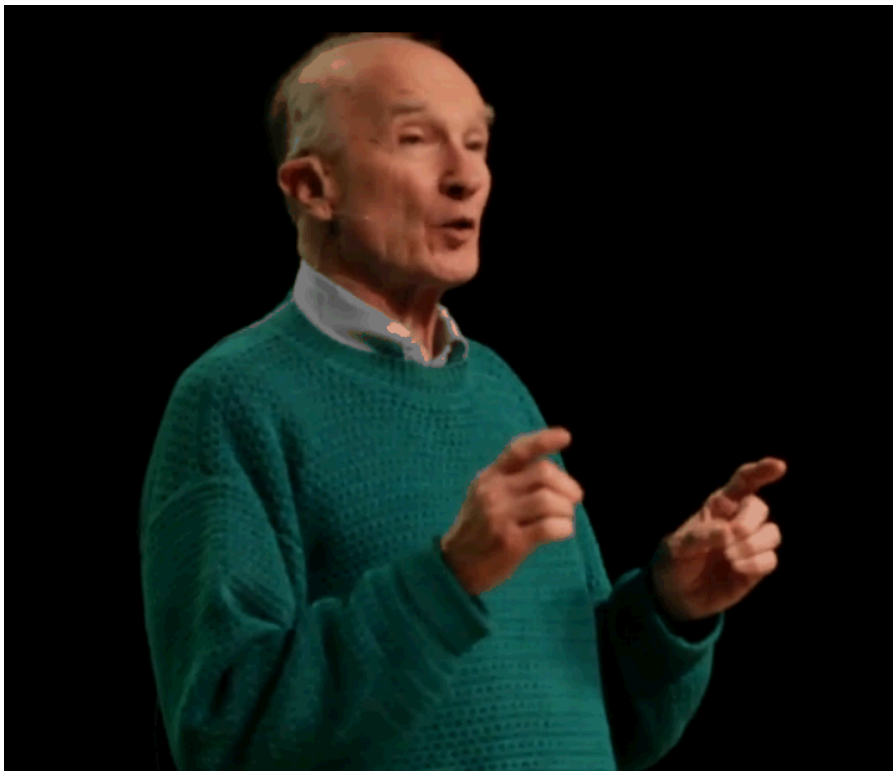
“I have initiated and faithfully executed recycling at my home – something I have *never* been even half interested in doing.”





How to Use a Paper Towel - Joe Smith

https://www.ted.com/talks/joe_smith_how_to_use_a_paper_towel?language=en





Zero Waste Facility – Scorecard

Facility Totals (Pre Certification Estimates)				Points
Bronze: 31-37 points Silver:38-45 points Gold: 46-63 points				80
Platinum 64-80 points				
Overview of Categories & Points				
Redesign	4	Leadership		6
Reduce	7	Training		7
Reuse	7	ZW Analysis		5
Compost (Re-earth)	7	Upstream Management		4
Recycle	3	Hazardous Waste Prevention		5
ZW Reporting	4	Closed Loop System		4
Diversion (Min 90%)	5	Innovation		3
ZW Purchasing	9	Total Points		80

By U.S. Zero Waste Business Council – now working with GBCI

Zero Waste Resources

- [Zerowaste.sandia.gov](https://zerowaste.sandia.gov)
- Zero Waste Office Assessments
 - Use Zero Waste Hierarchy
- Office Cleanout Checklist
- Zero Waste message presentations
- Zero Waste events



If You're not for Zero Waste, how much Waste are you for?



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Questions or Comments?

*Thanks,
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