



Wes Westbrooks; Waste Logistics
April 2014

GOING LANDFILL FREE; THE ULTIMATE JOURNEY

**BMW
GROUP**



WASTE TOPICS

INTENT

- The intent of this presentation is to give just an overview of what BMW Manufacturing went through to achieve a landfill free status. And though the journey is not complete, due to our paint sludge, we are proud of our achievements thus far.
- All production and non-production waste streams as well as the construction waste from Plant Spartanburg is not going to a landfill. The only exception is our paint sludge, which falls under the F019 exemption codes due to the aluminum processes within the paint shop.
- BMW was fortunate enough to partner with a waste provider in Nexeo Solutions to help achieve our goals. Since building cars are our specialty we made sure to enlist the help of the experts.

WASTE TOPICS

GENERAL OVERVIEW

- Get Inspired; visit other companies or attend workshops.
- BMW had to establish a team to assist in its efforts. The team needed to be a cross section of every department.
- Set up a phased approach by departments; to avoid taking on too much at one time.
- Confirm and solidify Senior management resources.
- Determine which waste streams needed the largest effort.
- Make sure the onsite waste provider was fully behind the initiative.
- Keep it simple; make all aspects easy for the associates to grasp and understand.
- Communicate frequently and often to make sure everyone is clear about the plants initiative and why.
- Field all questions; leave nothing to chance , conjecture or rumors are bad for business.
- Be patient.
- Standardize all things possible.
- Repeat all the steps above, daily, weekly, monthly.....

ZERO LANDFILL INITIATIVE

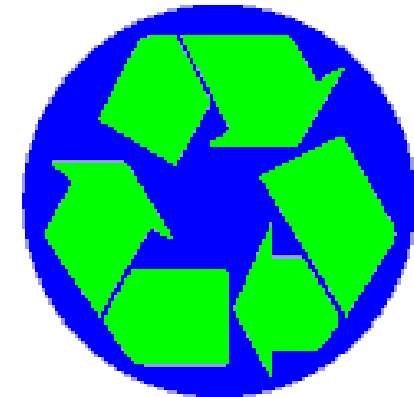
WHAT IS ZERO LANDFILL?

Zero Waste to Landfill

No waste or by-products generated at the plant go to landfill

How to Achieve

1. Reduce waste
2. Reuse materials
3. Recycle everything possible
4. Waste to energy for remainder



Why Not Everything Waste to Energy?

- Loss of recycling refunds
- Costs of WtE

ZERO WASTE TO LANDFILL INITIATIVE

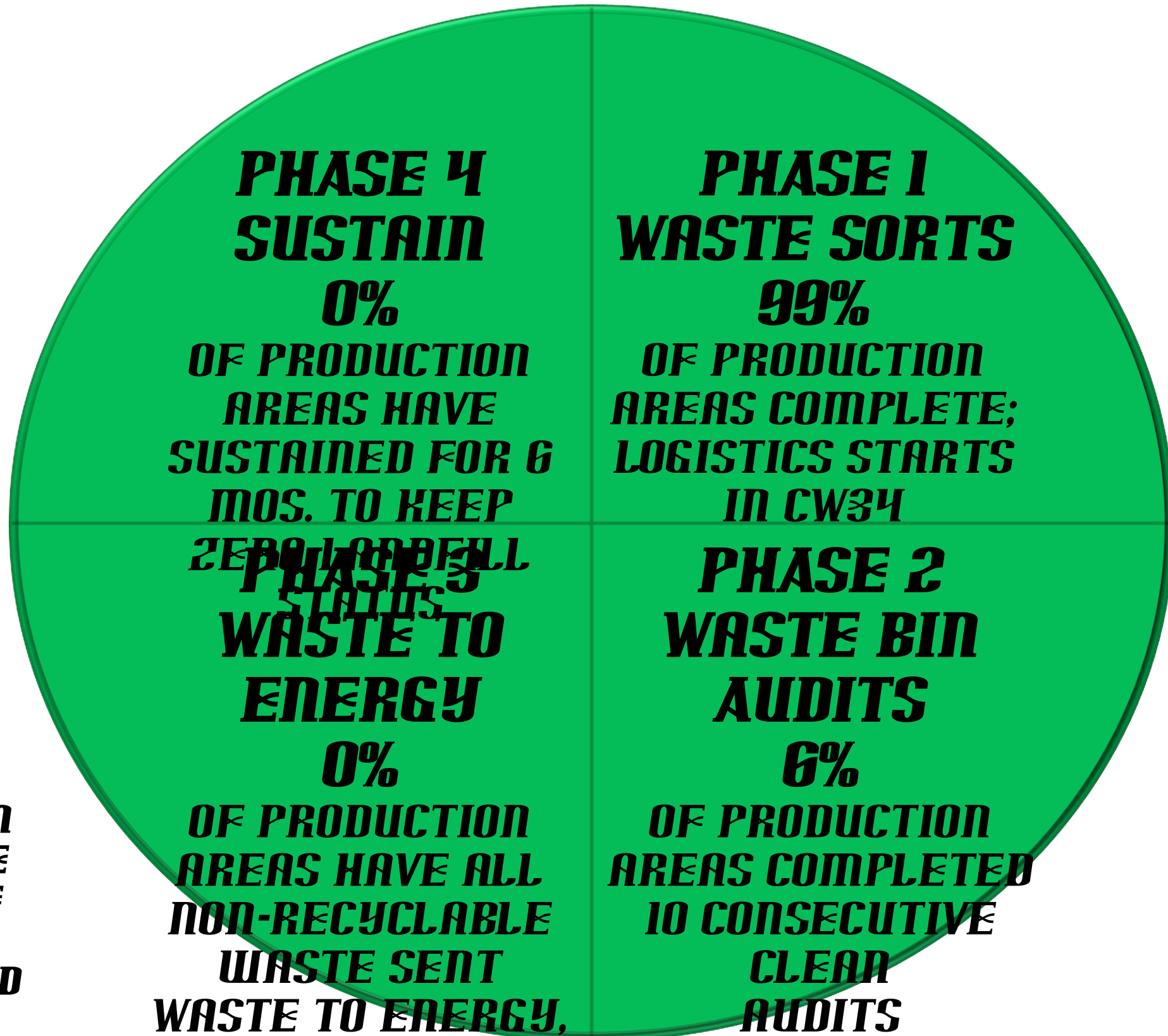
PROJECT DESCRIPTION

- The goal of the project is to reduce waste to landfill in percentage as well as in total volume.
- Create transparency of landfill waste streams and sources.
- Establish weight per unit target responsibility in each relevant department.
- Establish long-term plan for reduction / elimination of waste to landfill.



ZERO WASTE TO LANDFILL INITIATIVE

PHASE COMPLETION OVERVIEW



**ZERO
LANDFILL
TARGET:
1 TS-4 CC IN
EACH ZONE
BY END OF
2011,
100% BY END
OF 2012.**

WASTE TO LANDFILL REDUCTION PROJECT. ASSEMBLY ZERO LANDFILL INITIATIVE.

This is what BMW is committed to no longer be a part of.



ZERO WASTE TO LANDFILL INITIATIVE

THE GREEN TEAM

With senior management approval; created a project team comprised of associates from all departments and shifts to participate. We started with the Assembly Shop first.

The same process was repeated for Paint and Body Shop.

The "Green Team"			
TS-45	Zone Section Manager	Green Team Member A-shift	Green Team Member B-shift
Zone 1	Jon Jarvis	Karen Knon	Michelle Holloway
Zone 2	Chris Kirby	Brian Parrish	Billy Sheridan
Zone 3	Les Cooper	Ron Anderson	Ellen Drennon
Zone 4	Renita Williams	Donnie Pitman	Billy Adams
Zone 5	Ken Ham	Dan Carter	Anthony Tricarico
TS-46	Zone Section Manager	Green Team Member A-shift	Green Team Member B-shift
for all zones		Bennie Bobo	none

ASSEMBLY ZERO LANDFILL INITIATIVE

WHY DO WE CARE?

- Customers
- Competitors
- Our Neighbors and Us
- Sustainability
- TS-4 Pride



GM's waste won't be headed to a landfill

Sixty-two of GM's manufacturing plants worldwide have achieved "zero landfill" status by recycling or reusing all normal plant wastes; this means 43 percent of its global manufacturing facilities no longer send any production waste to landfills.

More than 2 million tons of waste materials will be recycled or reused at GM plants worldwide in 2010. And an additional 45,000 tons will be converted to energy at waste-to-energy facilities, the company said in a press release.

Subaru Marks Three Years of Zero Landfill - Subaru Sells 100,000th PZEV Vehicle

Both milestones reflect the long-standing commitment Subaru has to safeguarding the environment that so many of its customers avidly enjoy.

Toyota Thinking Green - Toyota Motor Sales Headquarters Announces Zero Waste to Landfill

January 22, 2007 - Torrance, CA - Toyota Motor Sales (TMS), U.S.A., Inc. announced today its Think Green! program, which achieves a high recycling rate and zero waste to landfill at TMS headquarters. Toyota's comprehensive Think Green! program sets an environmental benchmark for the automotive industry.

Green is the word for Mercedes' Alabama operations

... the plant achieved zero-landfill status, which means none of its waste ends up in a garbage dump.

Boeing South Carolina Achieves Zero Waste to Landfill Status

NORTH CHARLESTON, S.C., April 13, 2011 - Boeing [NYSE: BA] announced today that the South Carolina 787 production, final assembly and delivery site has become the company's first commercial airplane production facility to achieve zero waste to landfill status. The North Charleston, S.C., site is the fourth within Boeing to reach this milestone achievement.

ZERO WASTE TO LANDFILL INITIATIVE

ASSEMBLY ENVIRONMENTAL IMPACT WEEK

What: A plant-wide “power week” to roll out tangible improvements to recycling in the plant.

When: Targeted for CW42 (October 16-22)

What:

**1. SHADOWBOARDS &
VENDING MACHINE
INFORMATIONALS**

**4. OUTDOOR
COLLECTION CENTERS**

2. TS-4 VIDEO

**5. RECYCLING
TRAINING FOR PLANT
ACCESS**

**3. HIGH TRAFFIC
COLLECTION CENTERS**

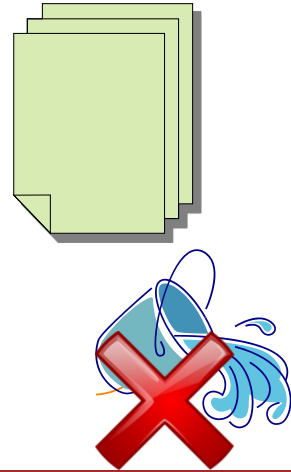
ZERO WASTE TO LANDFILL INITIATIVE

WHAT GOES TO LANDFILL?

Paper Recycling

Mixed Paper

- ✓ Paper Towels
- ✓ Empty Paper Drink Cups
- ✓ Sticky Notes
- ✓ Catalogs
- ✓ FedEx Mailers
- ✓ Folders
- ✓ Bound Books



No Liquids, No Styrofoam,
No Coffee Cup Lids

Plastic Recycling

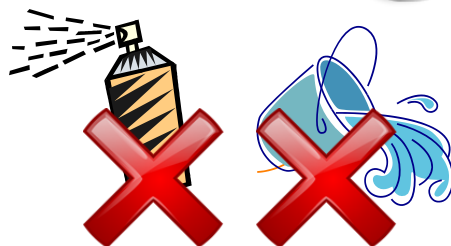
- ✓ Plastic Bottles
- ✓ Plastic Coffee Cup Lids
- ✓ Clean Yogurt Containers
- ✓ Straws
- ✓ Plastic Cups
- ✓ Stretch Wrap
- ✓ Bubble Wrap
- ✓ Clean Sandwich Bags



No Liquids, No Food Waste

Metal Recycling

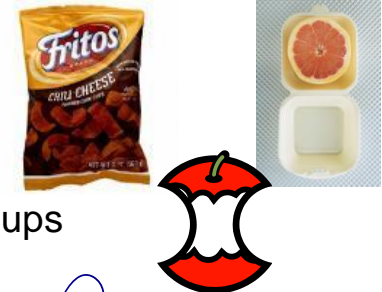
- ✓ Empty aluminum cans
- ✓ Small quantities



No Aerosol Cans
No Liquids

Non-Recyclables

- ✓ Food Waste
- ✓ Candy Wrappers
- ✓ Potato Chip Bags
- ✓ Granola Bar Wrappers
- ✓ Styrofoam Plates and Cups
- ✓ Other Non-Recyclables



No Liquids
No Recyclables \$\$\$



and contaminated recyclables...

SEGREGATE AT THE POINT OF GENERATION.



Use of X-frames, with sort lids. Each X-frame or blue bin is properly labelled to promote segregation

Green Team: Creation of Assembly management associates to help promote recycling.

- Select responsible team members
- Recycling leaders in their area
- Recycling resource for questions
- Promote segregation in their area
- Kill recycling myths or squash any negative recycling rumours

RECYCLING

“DUMPSTER DIVES”



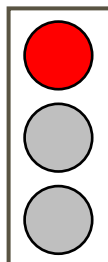
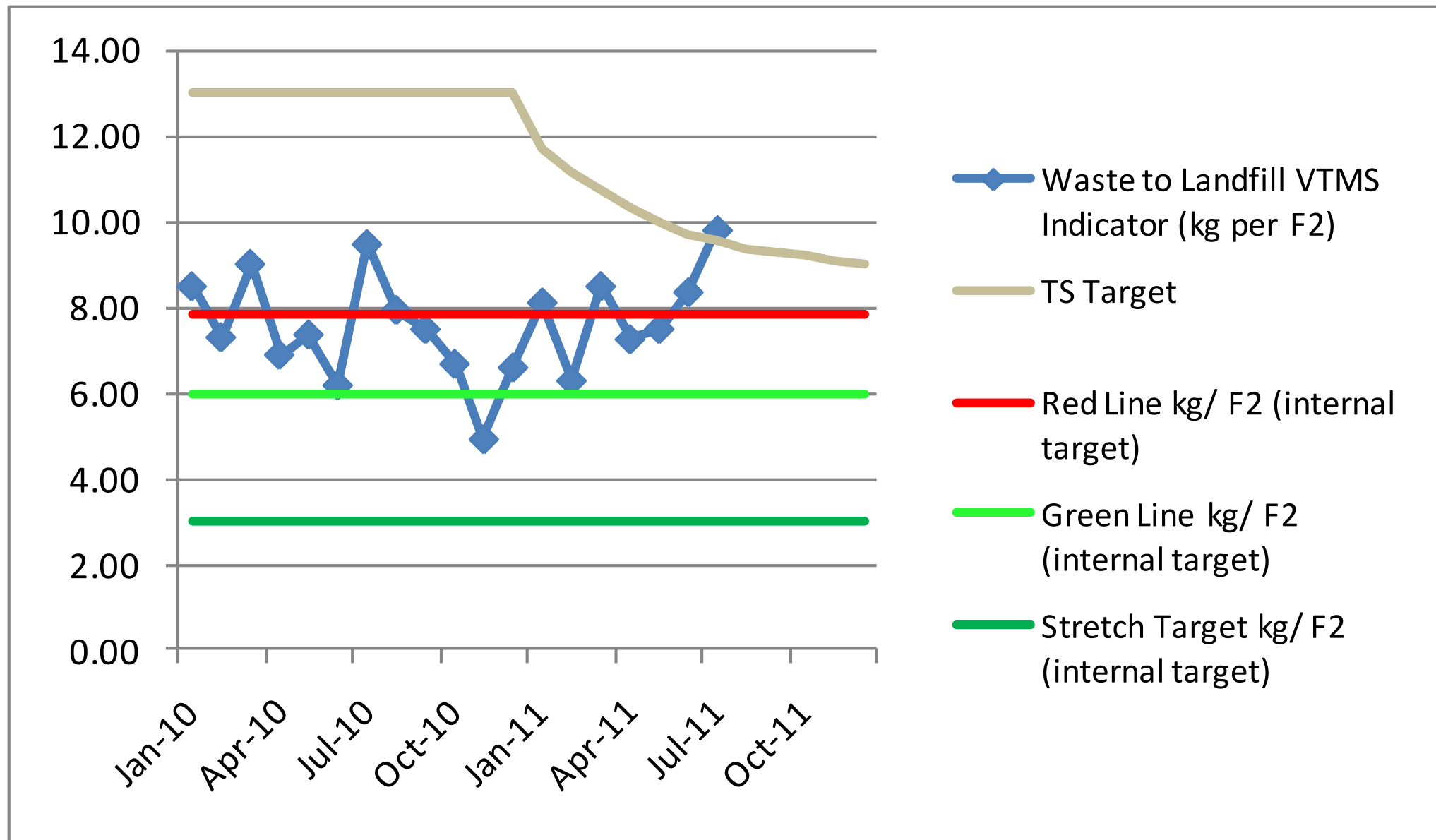
Final Result:

Out of 13 landfill bags, only 1 ½ remain.
The rest was recycled. A win for the environment and for
BMW (\$\$ refunds!).

The participating associates are asked to take the
“lessons learned” back to their teams and help improve
recycling.

ZERO WASTE TO LANDFILL INITIATIVE

CURRENT STATUS WASTE TO LANDFILL PLANT 10



Clean-up activities for Board visit, H50, LC1/2 and WWT Sludge increases drove WTL red in July.

Long-term forecast “light” green (internal target) due to TS-4 initiative to achieve Zero Landfill by the end of 2012. Deep green cannot be achieved without significant reductions in other Technologies and WWT Sludge.

ZERO WASTE TO LANDFILL INITIATIVE

WASTE TO LANDFILL OVERVIEW BY TECHNOLOGY (IN KG PER F2)

Waste to Landfill Streams		Apr-11		May-11		Jun-11		Jul-11		
		Apr kg per vehicle	% of WTL	May kg per vehicle	% of WTL	Jun kg per vehicle	% of WTL	July kg per vehicle	% of WTL	
Trash	Body Shop (6 yard) -- (Not included on Waste generated report Apr - Jun)	0.92	11.3%	0.58	7.2%	0.67	7.2%	0.30	3.0%	↓
	Paint Shop (40 yard compactor)	1.02	12.5%	0.85	10.5%	0.87	9.5%	1.10	11.2%	↑
	Assembly H50 (dock 3.30, 40 yard compactor)	3.02	37.0%	2.10	26.1%	2.13	23.1%	3.17	32.4%	↑
	Assembly H52 (dock E039, 40 yard compactor)	1.17	14.3%	1.11	13.8%	1.85	20.1%	0.97	9.9%	↓
	Non Production (LCs, clean-ups)	0.67	8.2%	0.69	8.6%	0.88	9.5%	1.14	11.6%	↑
WWT Sludge	WWT Sludge	1.37	16.8%	2.73	33.8%	2.80	30.5%	3.12	31.8%	↑
Total Waste to Landfill		8.17	100%	8.07	100%	9.20	100%	9.80	100%	
on Wastes Generated Report:		7.25		7.49		8.35		9.80		

- Wastewater Treatment Sludge has steadily increased and is leading to an overall landfill increase. PA-602 is pursuing beneficial reuse options with the EPA. Paint Shop should continue to pursue measures to increase % solids and reduce weight.
- TS-4 will be Zero Landfill by the end of 2012. This is currently ~40% of the landfill.

ZERO WASTE TO LANDFILL INITIATIVE

MORE GREEN FOR GOING GREEN



Cardboard

- Baled vs. Loose: By baling your OCC you will increase your refund from 42%-50% over loose.
- Yellow sheet pricing increases by \$60 per ton.
- Recycle in stead of going to landfill.

Metal

- Metal recycling is one of the most lucrative waste streams you can recycle.
- Metal pricing based on AMM

MORE GREEN FOR GOING GREEN.



Plastics

- Plastic drink bottles, cups or plastic bags can be recycled
- Look into any local outlets that can help

And of course, we recycle the usual suspects...



WASTE TOPICS

USED OIL

- Used oil is captured from all areas of the assembly and body shop floor
- Used oil can be sold for a profit



WASTE TOPICS

AEROSOL CANS

- Aerosol cans are generated as Hazardous Waste
- Once the remaining material is expressed out, the cans become pure profit



AND LAST BUT NOT LEAST, HIT THEM WHERE IT COUNTS....REMIND PEOPLE WHY WE DO, WHAT WE DO...ONE MORE TIME!



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