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## Towards a Zero Landfill Metallizing Facility

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There is decent availability of land in North America for landfills. However, the vast majority of people do not want landfills located near them or their food sources, particularly in high density areas in and around cities where most garbage is produced. Maintaining the infrastructure and logistics around a landfill is becoming increasingly costly for municipalities. These costs are passed on to the consumer via consumer goods tipping fees or higher local taxes. In addition, younger generations are particularly engaged in the idea of more sustainable, environmentally conscious solutions, and identify landfills as a worst-case last resort option only.

Many retailers, CPG's, automotive companies and their suppliers have responded by engaging in activities that either reduce or eliminate their landfill waste. For many companies, their efforts are not solely to satisfy consumer demand. They also believe landfill reduction activities contribute to their long-term financial sustainability by reducing waste disposal costs. They also believe these activities will improve relations with the local municipalities they operate in and enhance their standing within the community.

Celplast embarked on a journey towards becoming a zero landfill facility back in 2008. This was somewhat due to encouragement from flexible packaging converting customers to follow their lead. It was also an opportunity to eliminate some waste disposal costs and streamline operations as part of Celplast's Continuous Improvement program. Mostly, it was because the company's management team, most of who had very young children at the time or have had children since then, believed it was the right thing to do for future generations.

This paper shares some of Celplast's experiences with working towards this goal. We present landfill reduction achievements as well as the relative financial benefit. We also share some of the longer term ideas the company has to create new solutions for the industry.

### Sources of Landfill Waste

Figures 1 & 2 graphically show the various forms of waste that are produced from a metallizing operation. There are many associated with the incoming film, including incoming packaging and losses generated throughout the process: rejected rolls, cutbacks (mostly from clear film start-up & shutdown), trim losses, and supplier packaging. There are also many associated with metallizing itself: used boats, leftover wire, used wire spools, aluminum dust & slag, butt rolls, used cores and waste oil & solvents. Finally, there is landfill waste generated by activity in the office, generating both recyclable and non-recyclable waste streams.

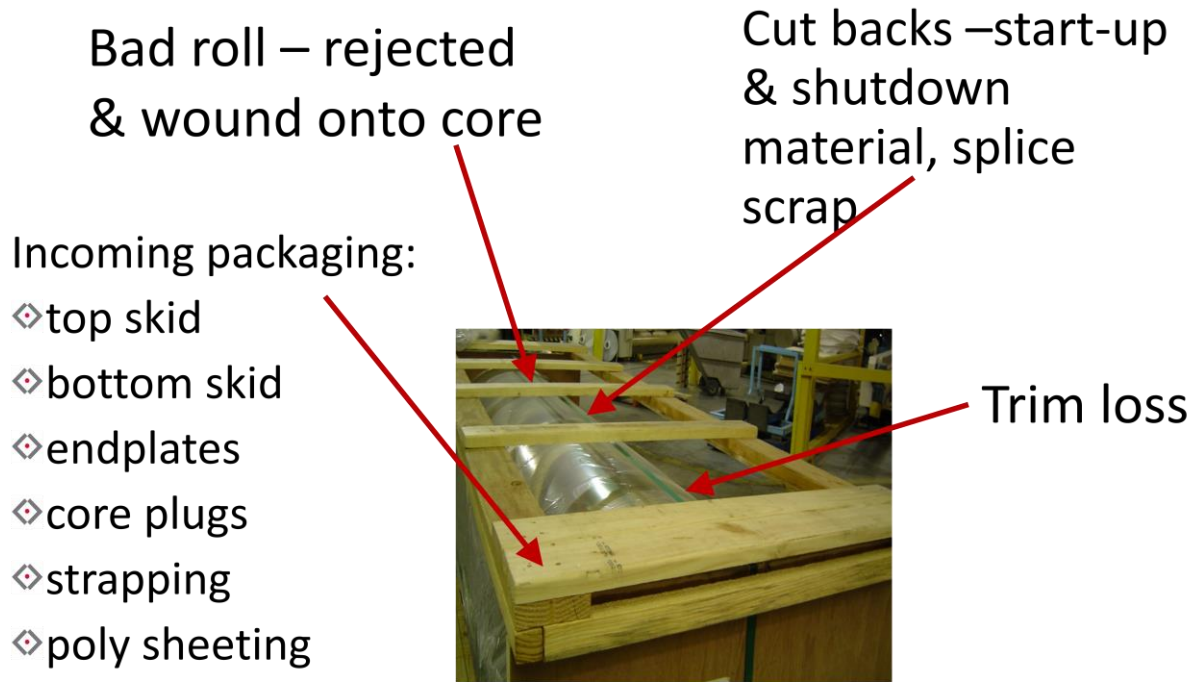


Figure 1: Sources of Waste from Incoming Material

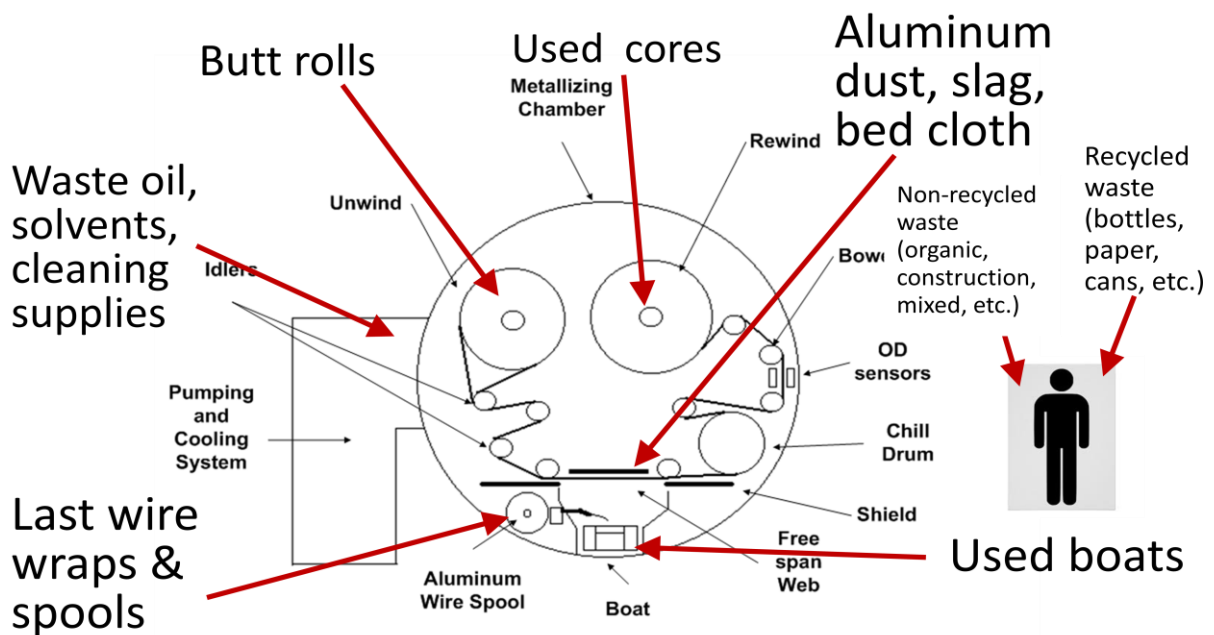


Figure 2: Sources of Waste from Metallizing Operation & Human Activities

## Landfill Waste Reduction Initiatives: 2008 - 2014

Some waste streams were already being diverted from landfill prior to 2008:

- ◇ Rejected rolls: to industrial plastic recycler
- ◇ Used spools: to industrial plastic recycler
- ◇ Aluminum wire from used spools: to aluminum recycler
- ◇ Aluminum dust & slag: to aluminum recycler

Over the last 6 years, Celplast undertook several waste reduction initiatives with local recyclers to further divert waste from landfill and into recycling streams:

- ◇ Film cutbacks & butt rolls: to PET bottle recycler and industrial uses
- ◇ Film trim loss: to recycler for 2" x 2" plastic lumber
- ◇ Used cores: to paper & board recycler for industrial uses
- ◇ Supplier skids: animal bedding, garden mulch
- ◇ Used boats: ground up for industrial use
- ◇ Office bottles, cans, glass, rigid plastic: municipal recycling stream

The shift in material diverted from landfill from 2008 to 2014 can be seen in Table 1. The financial impact of this shift on waste disposal costs can be seen in Figure 3.

**Table 1: % of Material Going to Landfill in 2008 vs. 2014**

Potential Landfill Waste Source	Amount Generated Monthly (kg), Normalized to 2014	Amount to Landfill Monthly (kg)	
		2008	2014
Rejected rolls	6,400	0	0
Film cutbacks	9,000	9,000	0
Film trim loss	3,500	3,500	1,170
Film butt rolls	9,000	0	0
Supplier cores & used cores	800	800	0
Supplier skids & packaging	26,000	26,000	600
Old boats	130	130	0
Last wire wraps	200	0	0
Used spools	300	0	0
Aluminum dust/slag/cloth	1,800	0	0
Hazardous waste - oil,solvent,rags	690	690	690
Office waste - recyclable	300	300	0
Office/lunchroom/construction waste - not recyclable	500	500	500
<b>Material to landfill monthly</b>	<b>58,620</b>	<b>40,920</b>	<b>2,960</b>
<b>% of Total to Landfill</b>		<b>70%</b>	<b>5%</b>



**Figure 3: Change in relative waste costs over period of landfill reduction initiatives**

## Customer Package Recycling

In 2008, trials were carried out with local customers to pick up & recycle some of the packaging used by Celplast to package its finished goods rolls. These were set up at almost no cost as they were backhaul routes with local trucking company. By providing the proper infrastructure to make it easier for customers to stack Celplast’s packaging material, there was a high customer participation rate. Celplast was able to re-use various items, including skids, endplates, core plugs, H-channels and cleats. These are currently delivered to a sortation area, where packaging materials are sorted and arranged so they can go right back into Celplast’s incoming packaging storage area.

This was scaled up in 2009 with several local customers, and has been running successfully since then. Since these materials were diverted from our customers’ landfill waste stream, these reused goods can actually be deducted from Celplast’s own monthly landfill quantity to calculate a net landfill waste total.

As can be seen in Table 2, based on the latest year’s data Celplast’s customer packaging recycling has allowed it to achieved a net negative landfill waste position.

**Table 2: Net % of Material Going to Landfill in 2008 vs. 2014**

	Amount to Landfill Monthly (kg)	
	2008	2014
<b>Material to landfill</b>	<b>40,920</b>	<b>2,960</b>
<b>% of total to landfill</b>	<b>70%</b>	<b>5%</b>
<b>Recycled package materials</b>	<b>0</b>	<b>-4,900</b>
<b>Net material to landfill</b>	<b>40,920</b>	<b>-1,940</b>
<b>Net % to landfill</b>	<b>70%</b>	<b>-3%</b>

## Becoming Part of the Flexible Packaging Waste Solution

Celplast has invested in working with a local recycler, not only to try to find uses for a remaining portion of its waste currently going to landfill, but also to create more value in the products being recycled. Both of these would lower disposal costs further. They would also enable Celplast to help develop technologies that could have broader practical application for mixed plastic waste streams from other flexible packaging converters. This investment is based on the concept of putting wood inserts into a mixed plastic waste outer shell, creating products that benefit from the properties of both materials in higher value applications such as fence posts, traffic guardrail posts and railroad ties. Work is just in its initial stages, but we are excited about the potential this technology has to offer to communities and consumers alike.

## Conclusion

It is possible to divert a significant level of waste from landfill to recycling or reuse streams. Celplast has achieved a negative net landfill position by minimizing its own landfill waste while also diverting waste from its customers' facilities. There are projects underway to achieve even further reductions in landfill waste. With a little hard work and creativity, there are opportunities for everyone in the converting industry to reduce their waste generated as well as waste disposal costs, and to achieve or surpass a position of zero landfill.