



INSIGHT

HP Shows Off Another Phase of Its "Closed Loop" Inkjet Cartridge Recycling Process with a Tour of the Lavergne Group Facility

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IDC OPINION

One year after inviting analysts to its Nashville-based inkjet cartridge recycling facility, HP initiated another visit to one of its partners' sites. This second visit to observe HP's "closed loop" cartridge recycling process was to the Lavergne Group in Montreal, Canada. The visit offered the opportunity to see how polyethylene terephthalate (PET) plastics are blended with Lavergne's formula to create recycled PET (RPET). This new material is then used by HP to manufacture new inkjet cartridges. The results are impressive:

- ☒ **Both parties showed a determined effort to achieve the RPET goal.** The organizations had been working together behind the scenes for five years (2000–2005) before even one cartridge was processed. It was another three years (2008) before the plan was formalized. While there were times during this extensive process when the effort seemed threatened, it continued and has since achieved some significant recycling milestones.
- ☒ **There are a lot of complex operational processes and QC behind the scenes at these recycling facilities.** This site handles literally millions of pounds of materials. Sophisticated machinery as well as a "secret recipe" all contribute to producing recycled plastics at the same quality standards as brand new virgin plastics.
- ☒ **Positive impact on the environment is ongoing.** The effort significantly reduces our dependency on the earth's limited natural resources.

IN THIS INSIGHT

This IDC Insight highlights IDC's recent visit to the Lavergne Group in Montreal, Canada. This company partners with HP as part of the printer vendor's "closed loop" inkjet cartridge recycling process. The visit took place on April 14, 2010.

SITUATION OVERVIEW

Approximately one year ago, IDC visited HP's inkjet cartridge recycling facility just outside of Nashville, Tennessee (see *HP Impresses IDC with Its "Green" Inkjet Cartridge Recycling Process Demonstrated at the Company's Nashville Facility*, IDC



#218017, April 2009). The trip included several presentations from HP personnel on the extent of its recycling efforts as well as a facility tour, so that IDC could see the company's closed-loop cartridge recycling first hand.

The closed-loop process is defined as follows:

- Cartridges are sorted.
- Cartridges are put through a multiphase process for recycling.
- The plastics are separated. (The specific plastic is polyethylene terephthalate or more commonly known as PET.)
- The PET plastic is combined with additives and recycled bottle resin to create recycled PET or RPET. This is the step performed by the Lavergne Group.
- The use of recycled plastics in original HP inkjet cartridges closes the loop.

The Lavergne Group was mentioned during the Nashville visit as a partner that plays an important role in ensuring that recycled plastics retain original or "virgin" quality levels. Plastics are shipped from Nashville to Montreal, where the Lavergne Group blends the plastics from used cartridges and combines them with other additives and plastic resin from recycled water bottles to create "new" plastic for new plastics.

When HP was seeking a partner for this recycling process, it ended up selecting the Lavergne Group. This selection was made due to Lavergne's significant experience in plastics with automotive, appliance, and electronics industries. Lavergne's ability to bring recycled plastics back to "virgin" plastics standards was of primary interest to HP. Additionally, Lavergne had extensive experience with PET, the plastic that HP was interested in recycling, as well as familiarity with plastic purification — an important first step in the closed-loop process.

Lavergne's current and sole manufacturing facility is in Montreal, Canada. There are 60 employees at this facility, and the company also has sales offices in North America, Europe, and Asia. By 2011, the company intends to open up a second manufacturing facility in Vietnam. The expansion is in response to growing regional demands of several customers (including HP). For HP, this location will facilitate faster responses to changes in forecast volumes and potentially lead to simpler regional recycling strategies, reducing processing nodes and material transport.

The HP/Lavergne relationship started with a five-year development process in 2000 before the first cartridge was processed. These five years were spent working through many of the obstacles that prevented inkjet cartridge recycling, including the sourcing of recycled material, transportation logistics, and addressing the properties of the plastics.

From 2005 to 2008, HP and Lavergne worked to refine the closed-loop recycling process. This included taking it from the initial stages as a proof-of-concept pilot in early 2005 and then ramping into full-scale production in multiple manufacturing regions through 2008.

Currently, HP is about 20% of Lavergne's business. Lavergne has collaborated with HP on several projects, but the largest of these projects is the closed-loop inkjet cartridge recycling process.

The amount of HP plastics processed at the Lavergne facility is approximately 1 million pounds of RPET plastic per month for use in manufacturing original HP inkjet cartridges. To date, the highest amount achieved in one month was 1.7 million pounds.

The facility tour started with an overview of a new pilot program for disassembling cartridges. This machine removed labels, lids, ink, and foam from the cartridge — in contrast to the shredding process in Nashville. This pilot program, if as expected becomes part of normal operations for HP/Lavergne, could help supplement efforts in Nashville (e.g., process Canadian customers' cartridges). Of course, bringing more of the recycling capabilities under one roof will breed efficiencies as well as reduce carbon footprint in the process (e.g., reducing the need to ship to/from multiple destinations to close the loop).

It should also help achieve higher plastic recovery percentages. HP indicated that the current closed-loop process is recovering about 60% of the available plastics. The majority of this loss is due to yield impacts during the refining of the shredded cartridges. The pilot disassembly tool recovers more than 90% of the cartridge plastic, accounting for a 50% improvement in plastics recovery.

The next stop on the tour showed how plastics, bottle resin (e.g., Lavergne has processed more than 1 billion plastic bottles to create 25 million pounds of bottle flake used in RPET), and other additives are blended together. This blender mixes approximately 40,000–44,000 pounds of materials at one time. The average blending cycle is about three hours. It was also indicated that there are only two blenders of this size in North America. The other blender is used in the chemical manufacturing industry.

The additives (typically antioxidants) consist of 3–10% of the mix to create RPET. There is also a separate and smaller blending system for the additives.

Many questions were asked about the recipe for HP's RPET. This is a closely guarded secret — almost akin to asking about Coca-Cola's formula, so more specific details are, unfortunately, unavailable.

The next machine on the tour was the extruder. This is where the RPET is heated and melted at about 575F. The material is extruded and formed into spaghetti-like strands that are run through water to cool off. The strands are chopped into small bits and then processed for shipping. We ended the tour in the QC labs where plastic samples are tested throughout the process to ensure that standards are met.

Latest HP Recycling Achievements Related to the Print Market

Not surprisingly, part of the briefing was to update press/analysts on HP's latest recycling and environmental achievements related to the print market. The list and

corresponding numbers are impressive and clearly demonstrate HP's commitment to environmentally friendly printing:

- ☒ Since launching the HP Planet Partners return and recycling program for print cartridges in 1991, the company has recycled more than 319 million inkjet and LaserJet print cartridges. The program is active in more than 50 countries around the world.
- ☒ The unique closed-loop process for inkjet cartridge recycling started in 2008. To date, HP has produced more than 555 million inkjet cartridges through this process. The acceleration has been dramatic over the past two years. From 2005 to 2007, the combined number was 184 million. The combined 2008 and 2009 figure was more than double that of the three prior years at 371 million.
- ☒ Related to the above, 14.4 million pounds of recycled plastic were used in 2009 for new HP inkjet and LaserJet print cartridges.
- ☒ HP LaserJet print cartridges with energy-efficient monochrome toner enable energy savings of up to 35% on every page printed (versus conventional HP toner). The energy-efficient toner is the result of a new lower melting point (approximately 10C lower) to adhere toner to the page.
- ☒ All HP Everyday Paper is certified through the Sustainable Forestry Initiative or the Forest Stewardship Council. HP Office Recycled Paper contains 30% recycled fiber.
- ☒ This year, HP has initiated a closed-loop process for polypropylene plastics (in addition to the RPET plastics). So far, HP has built 1.9 million cartridges containing closed-loop polypropylene plastics.
- ☒ By 2011, HP has pledged to use 100 million pounds of recycled plastic in HP printers and cartridges (cumulatively from 2007 to 2011). Current printers made from recycled content include:
 - ☐ HP Deskjet D2600 is made from 50% recycled materials and requires 30% less energy than its predecessor.
 - ☐ HP Deskjet F4400 is made from 20% recycled materials and requires 55% less energy than its predecessor.
 - ☐ HP Photosmart A640 compact photo printer is made from 32% recycled materials and ships in a reusable tote for reduced packaging waste.

FUTURE OUTLOOK

There is no shortage of effort on HP's part when it comes to environmental concerns. The company's long-standing focus on societal and environmental issues has been deeply rooted since the founding of the company. The previous section highlights some impressive accomplishments by HP and its environmental print program.

It is interesting to note that quality is not sacrificed as part of its environmental messaging. Among the materials provided to IDC, HP indicated that it has invested significant resources into exploring the possibility of producing remanufactured cartridges. The conclusion was and remains that remanufactured cartridges may not deliver the same quality and reliability as original HP print cartridges. Thus, this is not an option from HP. Instead, the significant investment in the closed-loop process, as witnessed at the Nashville and Lavergne facilities, has been determined to be a more attractive alternative from both environmental and performance perspectives.

IDC's qualitative research on remanufactured/refilled cartridges reveals either a hot or cold response to these cartridge options. Some feel they are achieving significant cost savings over buying new cartridges and love this option (hot); others have complained about leakage and poor yields/quality (versus OEM cartridges) and resolved never to use the option again (cold).

Another interesting message was to continue promoting print's relevance in the market. At a glance, it may seem that environmental messaging frowns on printing and related aftermarket use. HP is in a curious position of promoting its environmental message without damaging the place of print in the market. IDC's own research shows that the print market takes a heavy blow from increasingly environmentally sensitive customers who view print as harmful to the environment. However, HP pointed out the following findings:

- ☒ Forest growth in the United States has consistently exceeded harvests since the 1940s.
- ☒ Driving a car for one mile has the same carbon footprint as printing 62 pages.
- ☒ Paper can be recycled up to nine times.
- ☒ 66% of paper is recovered for recycling in Europe.

Research has also shown that printed output offers benefits in responsiveness and comprehension, so it is clear that print plays a future role in information communication, even in the increasingly digital age. It means that HP is trying to promote avenues for its customers to gain the advantage of print while lessening the environmental impact. By eliminating unused or unwanted content, print is potentially not an ugly word in the environmentally conscious community but is an essential piece of home and office document/information communication.

The HP/Lavergne relationship is one of many in the print industry that demonstrates a heightened sensitivity to environmental concerns. We are encouraged by these efforts and would like other vendors to take similar actions. We believe as a collective industry, the hardcopy market and its participants still have much to capitalize on when it comes to the environment. Managed print services is an example of a great start, but it should evolve into comprehensive environmental programs that customers are actively seeking from their suppliers.

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