

1. Sources- Kate Cunningham and Heidi Gomez researched on behalf of the PROPS team
  - a. U.S. Dept. of Energy Office of Industrial Technologies
  - b. Environmental Protection Agency
  - c. Lyra Research, Inc
  - d. Environmental White Paper (Clover Technologies)
  - e. Recharger Magazine
  - f. International Imaging Technology Council, Imaging Spectrum Magazine
  - g. CNet (premier destination for tech product reviews, news, price comparisons)
  
2. Overview
  - a. New
    - i. HP: cartridge is made by HP and used once, then recycled.
      1. "new" HP cartridges include some recycled content. 1995 EPA RMAN guideline: 21-45%.
    - ii. Recharger Magazine "The plastic in each new laser toner cartridge takes three and a half quarts of oil to produce."
    - iii. Cost 13k page output is \$168.67
  - b. Remanufactured
    - i. OM: cartridge is made by Clover Technologies. Clover tech,
      1. world's largest collector and recycler of empty ink and toner cartridges
      2. Prioritize remanufacturing, reclaim as much reusable material as possible through collections
      3. Avoid landfilling of waste from collections and remanufacturing with a zero waste to landfill policy
      4. When Clover receives an empty cartridge, it is evaluated first for refurbishment and secondarily for material recovery through recycling. 97% of material in a cartridge is recyclable.
      5. Cartridge can be reused 4-8 times
      6. Cost from OM = \$97.80
  - c. Refill
    - i. Company drills a hole in the cartridge and refills with ink
      1. Poor performance
      2. Little or no time spent assessing cartridge condition
      3. Cartridges that cannot be refilled are often sent to a landfill
  - d. Soy
    - i. Soyprint: Purchases virgin cores from HP and fill with soy ink.
      1. Cost = \$195
  
3. Recommendation
  - a. Buy reman. from OM

#### 4. Support

##### a. Reduce, reuse, recycle

##### i. Can certainly reduce, but can't stop printing completely, reuse is the next best option

1. Clover Technologies group, white paper : "remanufacturing is the most environmentally responsible choice. When a cartridge is remanufactured, it is reused. Besides reducing consumption, reuse is the highest form of environmental responsibility. It is superior to recycling in that it doesn't use non-renewable resources to breakdown plastic and metal. A cartridge and all its components should always first be evaluated for remanufacturing. If remanufacturing is not possible, then responsible recycling should be pursued.
2. U.S. Dept. of Energy Office of Industrial Technologies and the Environmental Protection Agency. The U.S. Dept. of Energy Office of Industrial Technologies has stated that although the recycling of toner cartridges does have a number of benefits, remanufacturing is a superior choice, both environmentally and economically. The Environmental Protection Agency's Recovered Materials Advisory Notice (RMAN) recommends that procuring agencies establish procedures and policies that give priority to remanufacturing the agencies' expended toner cartridges. The EPA recommends reman first, recycled content second: "EPA recommends the return of used toner cartridges for remanufacturing and reuse or purchasing a remanufactured or recycled-content replacement cartridge."  
(<http://www.epa.gov/wastes/conserves/tools/cpg/pdf/nonpaper.pdf>)

##### b. Performance

- i. Boston-based research firm, Lyra Research, Inc., almost 80 percent of the businesses that switched to remanufactured cartridges found them to be equal to, or exceed, OEM performance.
- ii. Clover technologies "All of Clover's products are designed to meet or exceed OEM performance and are backed with a 100% satisfaction guarantee."
- iii. International Imaging Technology Council "Not one printer manufacturer prohibits the use of remanufactured cartridges as a condition of full warranty service." As reported by CNet, "Invalidating the warranty would violate the Magnuson-Moss Warranty Improvement Act. It's also an infraction of antitrust laws."

#### 5. Conclusion

- a. Most sustainable and cost effective option is to purchase remanufactured cartridges from OM which have been made by Clover Technologies.