

Use a laser, save a tree

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A forest. Credit: jac opo from Flickr

(PhysOrg.com) -- Laser un-printers that can remove toner from scrap paper so that it can be used again may be coming to an office near you in the future, results from a new Cambridge study show.

Dr. Julian Allwood, Leader of the Low <u>Carbon Materials</u> Processing Group at the University of Cambridge, and David Leal-Ayala, PhD student at this group, tested toner-print removal from <u>paper</u> by employing a variety of lasers.

The results showed that toner-print can be removed effectively without causing significant paper damage, allowing the paper to be reused, without being discarded, shredded or sent to a recycling plant.

Coupled with advances in low-energy laser <u>scanning technology</u>, copiers and printers, the research means that toner-removing devices may be a



common sight in offices around the country in the future.

Dr. Julian M. Allwood said: "What we need to do now is find someone to build a prototype. Thanks to low-energy laser scanners and laser-jet printers, the feasibility for reusing paper in the office is there."

The implications of the study also extend beyond the workplace and into the forest. Reducing the use of trees from the paper lifecycle is a real possibility. Along with saving forests from being used for new paper, reusing paper could save an additional 50-80% in carbon emissions over recycling.

The study poses the question of what would happen if paper was unprinted and reused instead of recycled. The action of removing toner with a laser would remove four steps from the paper production cycle: forestry, pulping, paper making and disposal by incineration or landfill.

Dr. Allwood added: "Material recovery through reusing eliminates the forestry step from the life cycle of paper and eradicates emissions arising from paper incineration or decomposition in landfill."

With the aid of The Bavarian Laser Centre, a total of 10 laser setups spanning a range of strength and pulse durations were tested in the study. The lasers also spanned the ultraviolet, visible and infrared spectrum. The paper used in the experiments was standard Canon copy paper with HP Laserjet black toner, common in offices around the world.

Once the paper was exposed to the <u>laser</u>, the samples were then analysed under a scanning electron microscope and subjected to colour, mechanical and chemical analyses.

The study predicts that the emissions produced by the pulp and paper recycling industry could be at least halved as a result of paper reuse.



"This could represent a significant contribution towards the cause of reducing climate change emissions from paper manufacturing" Allwood said.

Provided by University of Cambridge

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