# Changing the management of special waste, a Life cycle assessment

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## INTRODUCTION

In Denmark automotive shredder waste, copper-chromate-arsenic (CCA) impregnated wood waste and PVC waste is currently landfilled. This project uses an life cycle assessment approach to evaluate on this practise by comparing it to incineration as an alternate scenario, with the goal of determining the optimum treatment method.

## RESULTS

The life cycle assesment was created using the software EASEWASTE, to compare landfilling with incineration. The landfilling scenarios is created by using sources from scientific literature on emissions of leachate, while the alternate scenario incineration is based on an existing EASEWASTE model that is modified using data from a study on the FASAN incinerator testing combustion of different waste fractions

For PVC waste it was found that landfilling PVC causes very few impacts to the environment, as the PVC waste remains mainly inactive. PVC incineration, showed a typical impact scenario for incineration, savings in the categories global warming, acidification and nutrient enrichment, but loads in the human toxicity categories. However dioxin releases from PVC combustion, which is known to be a major problem, was not accounted for. In comparison the incineration is the more environmentally friendly option, but this may be changed by accounting for the extra dioxin release or a change in marginal energy source.

CCA impregnated wood waste landfilling causes major impact in the human toxicity via soil and ground water pollution categories. These big impacts are caused by the release of the arsenic that was originally used to preserve the wood. Incinerating CCA treated wood waste, causes almost the same impacts as incinerating PVC. Sensitivity scenarios run on the two management options could not change the overall conclusion that incineration was an environmentally far better option.

The major impacts from the landfilling of automotive shredder waste, was in the stored ecoxicity categories, especially in the stored ecotoxicity via water category. Incinerating the shredder waste causes an unusual high effect in human toxicity via water, besides the typical effects from incineration. In conclusion the incineration seems to be the better alternative, but only as long as the marginal energy source is coal, and the spreading of the stored toxicity is not given a high priority.

Another major concern that affects the results for all three fractions, is the utilization of bottom ashes from the incinerator. If the spreading of the contaminants left in the ashes is considered a major problem this may influence a decision on the preferred waste management technology.

## Conclusion

The three cases studied in this project shows that incineration, using the current waste to energy plants, may be a good alternative for managing of some problematic waste fractions. The major uncertainty in this conclusion is on the release of dioxin and the marginal energy source, and therefore incineration must be seen as a temporary solution for these fractions.