**Master thesis of *Wen-Cheng Yang***

# Fast heuristics for designing integrated E-waste reverse logistics networks

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Reverse logistics has attracted a lot of research attention recently, especially when the disposition of electrical appliances increases. Different recycled appliances may consume different levels of resources and may require very different recycling processes. Conventional reverse logistics optimization model usually considers only the optimal facility locations and assumes the facility can conduct all different recycling processes. This paper investigates a mixed integer programming model that solves for both optimal facility locations and facility planning for a general reverse logistics network. In particular, in a planning stage for a reverse logistics company, our model considers both location and facility type —a facility that can only process a specific category of recycled products, or a facility that can process more categories of recycled products. Since our mathematical programming model is more complex and NP-hard, we propose several heuristic solution methods based on previous research and conduct computational experiments on several scenarios using data collected from Taiwan's reverse logistics market. The computational tests show that our proposed solution methods can give a high-quality solution in a promising time much shorter than the optimization software CPLEX.

***Keywords*:** electronic waste, facility location, heuristics, mixed-integer linear programming, reverse logistics

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