

# Adding value to remanufacturing: Conceptualising a reverse logistics system for the collection of WEEE

Menzies Distribution Ltd and Heriot Watt University  
*A Scottish Institute for Remanufacture Case Study*

## Project background

This project brought together two of the UK's leading logistics organisations; Menzies Distribution Ltd (Menzies) and the Logistics Research Centre at Heriot Watt University. The purpose of the project is to evaluate whether Menzies' existing logistics capability and capacity can be leveraged to create a sustainable reverse logistics system for the collection of small household Waste Electronic and Electrical Equipment (WEEE) items for remanufacturing/refurbishing purposes.



Menzies have vast supply chain experience and operate a national network of vehicles and warehouses that reach every neighborhood across the country. They drive 130,000 miles every day, deliver 110 million delivery units every year, and can reach the hearts of major cities and right out to the most remote communities in the UK.

They operate the forward distribution and reverse logistics for news publication. Whilst delivering new news publications to their customers every morning, at the same time they retrieve and process circa 11 million unsold publications per week. Each unsold, returned publication is scanned, identified and sorted by Menzies at their distribution centres. Waste is sent to paper mills for recycling and retainables are recirculated to retailers with demand, or the publishers for redistribution.

Most of Menzies' return journeys were under utilised, so which presents a significant, repeatable backhaul opportunity. The news publication supply chain that is closest to the end-users (customer) offers the greatest opportunity for the potential collection of WEEE products suitable for remanufacturing. Potentially, Menzies existing logistics infrastructure and capabilities could be a unique resource for the collection and return of WEEE cores to facilitate remanufacturing.

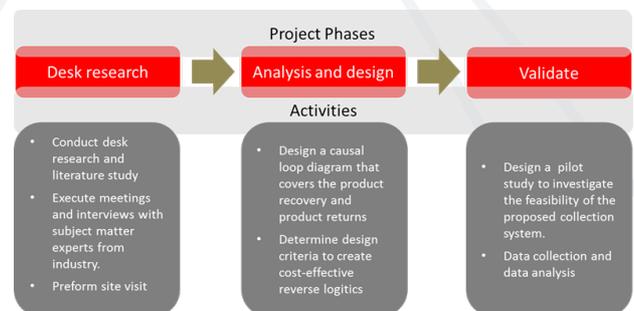
## Approach

The project was divided into three phases:

**Phase 1:** Identification and review of the literature to define trends and development, barriers and key success factors in reverse logistics and closed-loop supply chains.

**Phase 2:** Based on the findings from the literature review, a Causal Loop Diagram (CLD) was developed to understand the causes, impacts and pathways for the disposal and recovery routes for WEEE items.

**Phase 3:** The CLD was used to inform the design of a WEEE collection and reverse logistics system that would fit into Menzies existing operations and a pilot study was proposed. The CLD model also underpinned the future development of a system dynamic model.



## Project outcomes

Analysis of Menzies network structure indicated that the company's existing capability and capacity can be leveraged to create a sustainable reverse logistics network for the collection of small WEEE for remanufacturing purposes. Initial economic assessment revealed that the system could generate a new revenue stream through the capture of small WEEE from 'black-bag' household waste and reclaiming value from reuse/remanufacturing activities. Compared to traditional WEEE disposal routes at Household Waste Recycling Centre, it was expected that the improved handling and storage of the WEEE within the proposed collection system would lead to an increase in the remanufacturing potential (and value recovery) of the returned WEEE.

Analysis indicated a number of indirect economic benefits could be gained. By offering an alternative disposal option that is closer (and more conveniently located) to end users, the system would encourage disposal of WEEE items, thus increasing capture rates and reduce quantities of WEEE lost to landfill. This would lead to 1) increases in transportation rate so better (greater) utilisation of Menzies' surplus vehicle capacity, and 2) cost savings through economies of scale in transportation and logistics costs. However, the collection system would not generate direct operational cost savings for Menzies. Other indirect benefits of the collection system would be a new route to capture feedstock for electrical processing facilities; increasing their processing rates and the potential creation of new jobs.

Although the proposed collection model appears conceptually attractive, a careful and detailed economic and environmental assessment with real data is needed to evaluate the effectiveness of this reverse logistics network structure. In addition to this, real data would allow the research team to distinguish additional factors that would influence the economic attractiveness of the proposed collection system.

## Next steps

The next step of this project is to implement a live pilot study to investigate the feasibility of integrating the collection of small WEEE within Menzies' existing distribution network, and to establish whether WEEE return and remanufacturing rates would increase as a result. The pilot study will see the proposed collection system operationalized, and will generate much needed primary data to allow the conceptual model that was created in this project to be fully assessed and tested.

Accessing matched funding from the [Scottish Institute for Remanufacture](#) has enabled Menzies Distribution Ltd to understand the potential of creating a reverse logistics network using its existing capabilities. This next stage project (Pilot study for the collection of small Waste Electrical and Electronic Equipment (WEEE) in Glasgow) has already successfully secured funding from the Scottish Institute for Remanufacture. It will see Menzies and Heriot-Watt collaborate with waste electrical processors, CCL (North) Ltd to operationalize the collection system as a pilot study to demonstrate how Menzies' reverse logistic potential can be realised.

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